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Vol. XXVIII

September, 1951

No. 2

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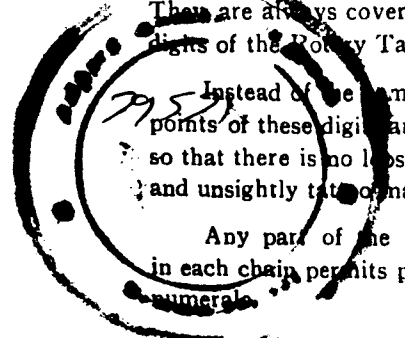
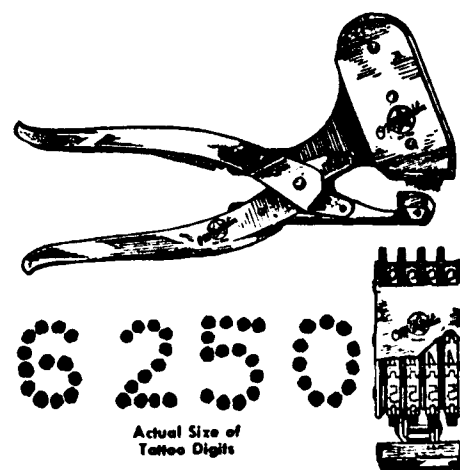
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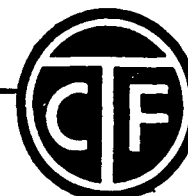
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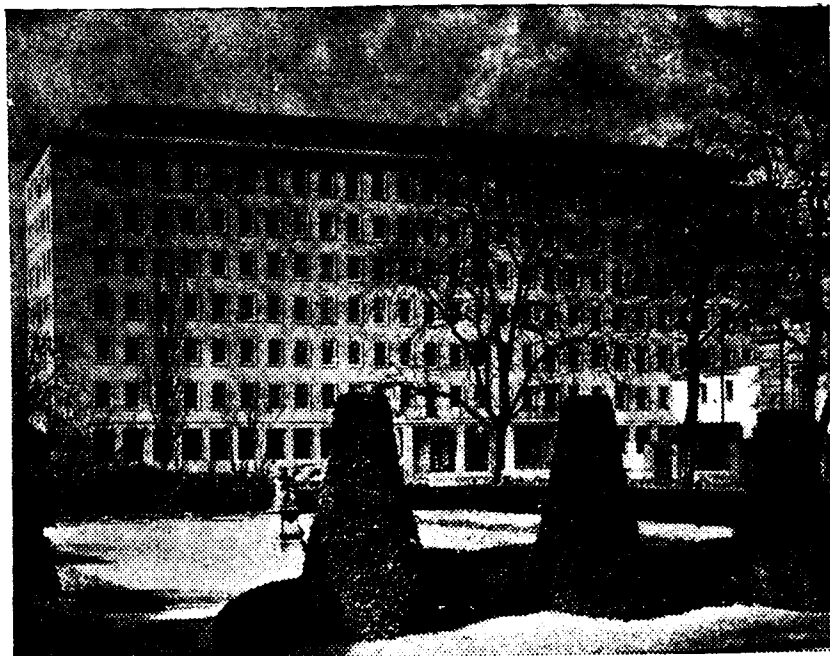
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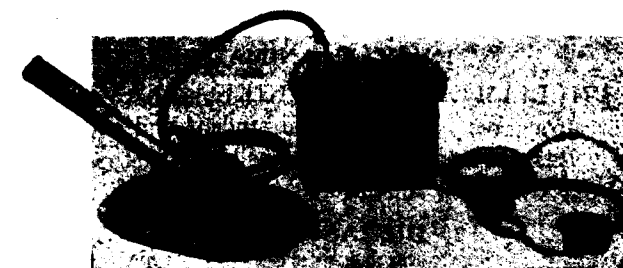
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THE Indian Veterinary Journal

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Vol. XXVIII

SEPTEMBER, 1951

No. 2

General Articles

LYMPHOID LEUKAEMIA IN DOGS—SOME OBSERVATIONS, INCLUDING A CASE TREATED WITH SYNTHETIC OESTROGEN

BY

M. S. DAS, B.Sc., M.R.C.V.S.,

Department of Pathology and Bacteriology,
Bengal Veterinary College, Calcutta.*

Introduction

It is well known that lymphadenopathy is a very common feature in very many diseases, infectious and otherwise. The response of lymphatic system is very quick and fairly constant in most pathological conditions. Such reactions may be simple and reversible, or complex and progressive. Leukaemia, as is known, is one of the latter varieties.

Hutyrá, Marek and Manninger (1946) define Leukaemia as "a general systemic disease associated with unlimited multiplication either of the lymphadenoid or of the myeloid tissues, resulting in the enlargement of the leucocyte-forming organs, increase of the white cells (sometimes at the expense of the r.b.c.) of the blood and the appearance of immature and pathological types of leucocytes in the blood stream. According as the lymphadenoid or myeloid tissue is affected, the disease is described as Lymphatic or as Myeloid Leukaemia"

In animals, the occurrence of myeloid leukaemia is considered to be of doubtful probability. Hence, we are mainly concerned with lymphoid leukaemia.

From the definition it may look like a simple matter but this is only the facade behind which lies a complex and intricate structure of the various aspects of the disease, such as its unsolved etiology, its varied

* The author is now Research Officer (Bacteriology) at the Indian Veterinary Research Institute, Mukteswar.

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clinical and pathological manifestation and the absence of any definite known treatment.

In most cases, widely varied and divergent reports are available. In fact, the more one probes into the available literatures, the more is the confusion and the more one gets nearer "not knowing anything about it". This may sound rather pessimistic but it is nearer to the true state of facts.

As far as is known, no published reference of this disease as it occurs in this country is available. It is intended to present in this paper a brief review of one's own experience and also to give the result of a new line of treatment for what it is worth. It is hoped that this will not increase the existing confusion.

Nomenclature

As far as can be ascertained, it was Siedamgrotzky (1871) who first described leukaemia in the case of a dog which showed enlarged lymph nodes and spleen and the ratio of the white blood to red blood corpuscles was found to be 1:15. Bollinger (1874) noted a condition in a dog which showed hyperplasia of the lymph nodes and the spleen together with leukaemic infiltration of the liver, lungs and a ratio of white to red blood cells as 1:5. Soon after, several other workers described cases of leukaemia mostly of lymphoid variety.

Weil and Clerc (1904) were amongst those who for the first time have examined blood of cases thought to be suffering from leukaemia. In one case they found the total number of w.b.c. to be 320,000.

For many years the disease has been known to veterinarians as Hodgskin's Disease or Pseudo-Hodgskin's Disease. The name Hodgskin's Disease was given apparently for its overall resemblance to a disease of the same name in human being. In human patients, this disease has been reported to be characterised by changes in the lymph nodes and elsewhere manifested by a connective tissue reticulum supporting variable numbers of lymphocytes and plasma cells together with mononuclear and multilobular or multinuclear giant cells with or without admixture of eosinophils and eosinophilic myelocytes and on occasions by areas of necrosis. There is great enlargement of the lymph glands but the spleen though enlarged is not huge (Price, 1933).

It has been found that the disease in dogs does not resemble the one in human subjects in every respect and hence the name Pseudo-Hodgskin's Disease was given. It is now definitely known that no case of Hodgskin's disease has been reported in animals. One or two cases which were reported as such were only clinically similar and did not prove to be so on histopathological examination which has for long been looked upon as diagnostic.

In October, 1845, Hughes Bennet described a chronic disease in a human patient characterised by blood changes together with the enlargement of the spleen and the liver. A month later Virchow recorded a disease also chronic in which he noted that excessive number of blood leukocytes was attended by splenomegaly. Ehrlich (according to Symmers, 1948) and Virchow (according to Piney, 1932) named the disease lymphoid leukaemia. The present name for the disease in animals has probably been adopted from Ehrlich.

The matter did not stop there; certain authors in recent years have given other names to this disease in dogs. Thus, Bloom and co-workers (1945) suggest the term Malignant lymphoma, apparently suggesting that they are neoplastic growths and they classify the disease according to the type of malignant cells, as Lymphoblastic, lymphosarcoma, mixed cell type and as Lymphocytic.

Feldman (1932) classifies leukaemia etc., as Lymphoblastoma; lymphoma meaning a benign and lymphocytoma meaning the malignant type. He suggests the use of the words leukaemic or aleukaemic before Lymphocytoma to qualify the haematological changes.

Other terms that have been used at one time or the other are Lymphadenoma, Lymphadenosis, Lymphomatosis, Malignant lymphoma etc.

Taking all things under consideration, especially, when the true nature of the disease is still not fully understood, and when its etiology is still obscure, one would think that the term 'lymphoid leukaemia' would be much more appropriate.

Etiology

It is a condition whose causative agent or agents are yet to be found out. Various views have been put forward at different times. Most of these report mainly on the contributory factors and a few on the exciting factors.

The two most widely-held views regarding the primary causes are the theory of the neoplastic origin and that of the infectious origin.

In human pathology, Obrastzow reported a case in which a nurse was affected with leukaemia after she had nursed a leukaemic patient. A similar case was reported by Cabot. These led to the belief that it was a disease of infectious nature.

An identical notion prevailed in veterinary pathology. But certain workers have reported negative results obtained from inoculation experiments. Ludke (H. M)* gave intravenous injections into six puppies using

*H. M. stands for Hutyra, Marek and Manninger, 1946.

material in the form of emulsion of bone marrow and spleen from a dog suffering from leukaemia. Only one puppy developed some degree of leukocytosis after an incubation period of four weeks and this too lasted only for six weeks.

White (1946) reports that several attempts to transmit the disease in dogs have failed.

Recently Dabberstein, Piening and F. & H. Schottler (H. M.) have succeeded in transmitting the disease in cattle by using emulsified lymphatic tissue, blood and blood serum from cattle suffering from what is known as East Prussian Cattle Leukaemia.

Our attempts in trying to transmit the disease experimentally into healthy dogs have not been successful. On two occasions four puppies were used as detailed in Experiments I and II (vide chart next page).

The consensus of opinion till the present moment is that the disease is not infectious. Apart from the failures to transmit the disease artificially by various workers there has been no report of the spread of the disease in any in-contact animal. In all the incidences come across by the present author there were always more than one dog in the house but there has been no sign of the disease in a second animal of the same batch. Even then it does not seem wise to declare without reservation that the disease is not infectious although it may be taken as definitely non-contagious. It is not unlikely that the reason of our not being able to transmit the disease is that the correct technique of introducing the relevant agent has not yet been evolved. Of course, this is just guessing.

On the other hand, the view that leukaemia is a neoplastic development is held by many workers. This idea has gained considerable ground not only because of the negative character of injection theory but also for certain positive observations reported by different investigators.

In its acute form the blood picture and certain other manifestations are similar to those found in infectious diseases but infection cannot explain the huge tumour-like growths of the lymph glands, liver, spleen etc. Further, the fact that acute cases terminate very rapidly is suggestive of the infectious nature of the disease. (But then again, how is one to explain the too numerous chronic cases?) The histopathology of the various organs reveal unusually heavy infiltration with a special type (lymphocyte-like) of cells.

The theory that leukaemia is neoplastic in origin was first put forward by Ribbert and Banti (H. M.). The reports of a number of cases of leukaemia in roentgenologists and in men who had worked with radioactive substances such as radium and thorium have been cited as evidence

EXPT. I
*Material taken from an Afghan Hound suffering from Lymphatic Leukaemia,
after the animal had been put to sleep.*

Puppy.	Material used.	Route of injection.	Result.	Remarks.
No. 1 & 2	Emulsified mixture of spleen, liver & lymph glands.	No. 1 Intravenous No. 2 Intraperitoneal	negative negative	All animals were kept under observation for five months. Blood examined periodically for any haematological changes.
No. 3 & 4	Whole blood	No. 3 Intravenous No. 4 Intraperitoneal	negative negative	

EXPT. II
*Material taken from a Pekingese suffering from Lymphatic Leukaemia
after the animal had died.*

Puppy.	Material used.	Route of injection	Result
No. 1 & 2	Emulsified whole lymph gland.	No. 1 Subcutaneously No. 2 Into the submax. lymph gland.	negative. Slight swelling of that gland persisting for five weeks; no other reaction.
No. 3 & 4	Emulsified mixture of liver, spleen and bone marrow.	No. 3 Intravenous No. 4 Intraperitoneal	negative. negative.

in favour of the theory that leukaemia is a malignant neoplastic disease (Stevens, 1933).

Symmers (1948) holds that the condition is a malignant neoplasm of the lymphoid system and the large number of immature lymphocytes observed in the blood stream are circulating metastases. Naturally, this view, although worthy of consideration, does not explain all aspects of the disease.

Bloom *et al.* (1945) state, with good amount of emphasis, that it is a neoplastic growth and they call it Malignant Lymphoma. They even go so far as to classify the disease according to the various types of cells that are associated in a particular form thereby drawing an obvious analogy with the sarcomatous growths.

Notwithstanding all the reports and arguments in favour of neoplastic theory it will be difficult to consider the possibility much more than a possibility. The fact that such supposedly neoplastic growths affect principally a particular system of organs and that the whole of the organ is simultaneously affected is something out of the ordinary nature of tumour formation.

Now, apart from these two main items linked with the etiology of leukaemia, there are certain other factors which have been implicated in the causation of this disease.

Possibility of disharmony of endocrine regulation resulting in deficiency and imbalance of hormones has been put forward by Naegeli (H. M.) to be related to leukaemic growth. Although this view has not met with such support it is found that certain types of neoplasms are associated with hormonal effects particularly with the oestrogens.

Silberberg M. and R. (1945) have shown that there is a relationship between leukaemia in mice and some sex hormones. Similar results are reported by Gardner, Kirschbaum and Strong (1940) and Burmester and Nelson (1945).

Marine and Rosen (1940) record increase in the incidences of lymphomatosis in male fowls which were castrated.

Whatever may be the exciting cause of leukaemia in animals, various factors have been mentioned as contributory or precipitating causes. Examples are hereditary factors, trauma, existing infective foci, animal parasites, drugs, pregnancy and other debilitating causes, chronic protein poisoning etc.

Dobberstein and Paarmann (1934) suggest that a chronic protein poisoning may play a part in the causation of leukaemic disorders in cattle and that such chronic poisoning may activate a latent infection with an

unknown virus in the diseased animals. In this connection Siegmund (1923) has shown that a parenteral inoculation of protein causes lymphocytic proliferation. Pentimalli (1929) has shown that chronic protein poisoning in rabbits brings about changes in the haemopoetic tissues very similar to those found in lymphatic leukaemia.

Egehoj (1947) carried out experiments to study reactions of cattle to parenteral chronic protein poisoning and reports that using skim milk as the foreign protein he was able to produce certain reactions in calves simulating changes in leukaemia, such as, increase in the size of lymph glands; increase in number of leukocytes (mainly lymphocytes); decrease in the number of erythrocytes and also changes in the histological structure of lymph glands, bone marrow, liver etc. Only a small number of these animals however showed clinical features of leukaemia.

Be that as it may, it will not be proper to conclude that protein definitely activates leukaemia. It is quite possible that the changes noticed may be altogether a different sequence of abnormalities.

Trauma of different kinds have been cited as secondary cause. In human pathology, Osler states that in some instances leukaemia has followed a blow. Jarmai (H. M.) observed a case in dogs in which contusion due to being run over appeared to be the precipitating cause.

Share-Jones (1927) reports a case of leukaemia in a powerful bulldog which was trampled upon by a cart horse; this was suspected to have caused injuries to the spine. Symptoms of leukaemia developed six months after the accident.

Out of the eight cases investigated by us, in one case there was a definite history of a severe fight with another dog resulting in injury in the throat region and eleven weeks later the animal showed illness which was diagnosed as leukaemia.

Cherry (1940) reports a case in a hound which showed signs of illness (leukaemia) soon after a hunting expedition.

Wirth (H. M.) considers that septic factor collaborates in the causation of some cases of leukaemia in dogs and in those cases he observed abscess, dental fistulae, pyometra and necrotic focus in lymph glands. Hutyra, Marek and Manninger (1946) report a case which was found to suffer from suppurating glands in the neck.

In one of our cases there was a persisting obstinate necrotic ulcer measuring about two inches by one inch in the region of the sternum.

No definite references are available to show implication of animal parasites in such matters. One has noticed that those cases which were more like acute conditions were invariably suffering from a heavy infesta-

tion with ankylostomes. Whether or not these worms were indirectly responsible for setting up leukaemia or whether or not the leukaemia in turn brought about a flaring up of ankylostomiasis is difficult to say. It must, however, be mentioned here that practically every dog of this part of the country suffers from some degree of ankylostomiasis.

Epizootiology

Breed.—Numerous, if not all, breeds are prone to the disease. It is difficult to say whether or not certain breeds are more susceptible. Bloom *et. al.* ('45) and White ('46) mention a high incidence in Aberdeen terriers. Innes *et. al.* ('46) also report three cases in the same breed.

One's own experience is that the larger breeds especially the Great Dane are more often affected. Cases recorded breed-wise are Afghan Hound-1, Pekingese-1, Cocker Spaniel-2, Great Dane-3, Wire Haired Terrier-1.

Sex.—It is thought that the disease is more common in the male as is found in men. Bloom and others ('45) report 12 males out of 20 cases. According to Innes *et. al.* ('46) the cases sex-wise were almost equally represented.

Five out of eight cases encountered by the present author were males.

Age.—Out of all these factors age seems to have a direct bearing on the occurrence of this disease. Most people think that the older animals are more liable to contract the malady. Cherry ('40) observes that the disease appears to be more common in older dogs. Bloom *et. al.* ('45) report an age range of 5 years to 12 yrs., the average being 9.08 yrs. White ('46) reports that the highest number of incidences was between the ages of 4 yrs. to 8 yrs; two out of forty-four cases were under three years of age. Most of our cases were over 7 yrs of age. The range was from 3½ years to 9 years, the average being 6.70 years.

Pathology

Clinical symptoms.—As has already been mentioned the disease manifests itself by the enlargement of superficial lymph glands, almost always of the spleen and often of the liver.

Acute condition of the disease has been reported. One's own experience has been that it is found mainly in a chronic form although this statement required some qualifications. From the time the seriousness of the illness is realised the condition goes from bad to worse very rapidly, thus simulating an acute form. This is mainly due to the fact that in majority of the cases the early stage of the disease mainly manifested by slight lassitude, dyspnoea etc., either goes unnoticed, or is, more often than not, treated symptomatically.

Lymphoid Leukaemia in Dogs.

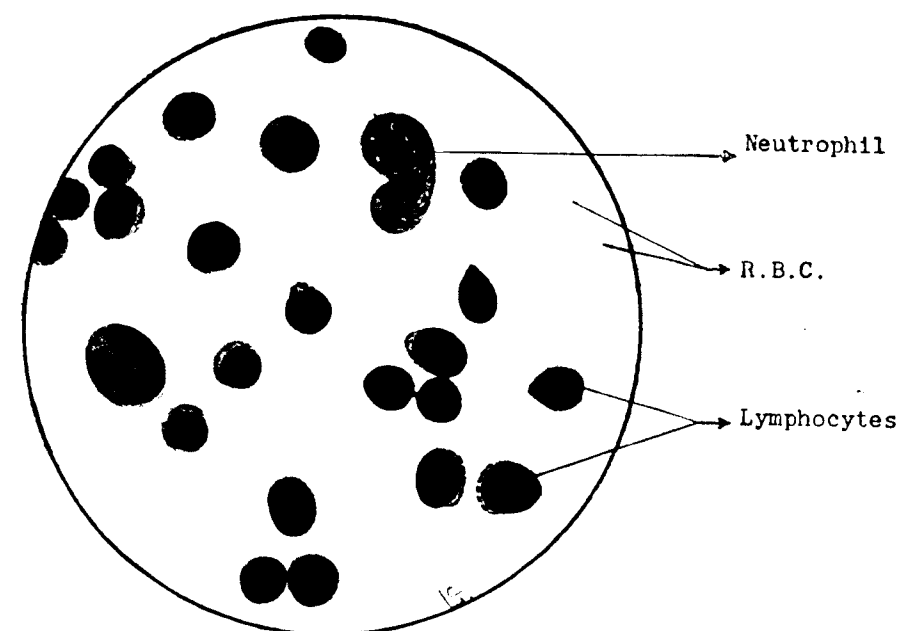


FIG. I
Blood smear from a case of Lymphatic Leukemia.

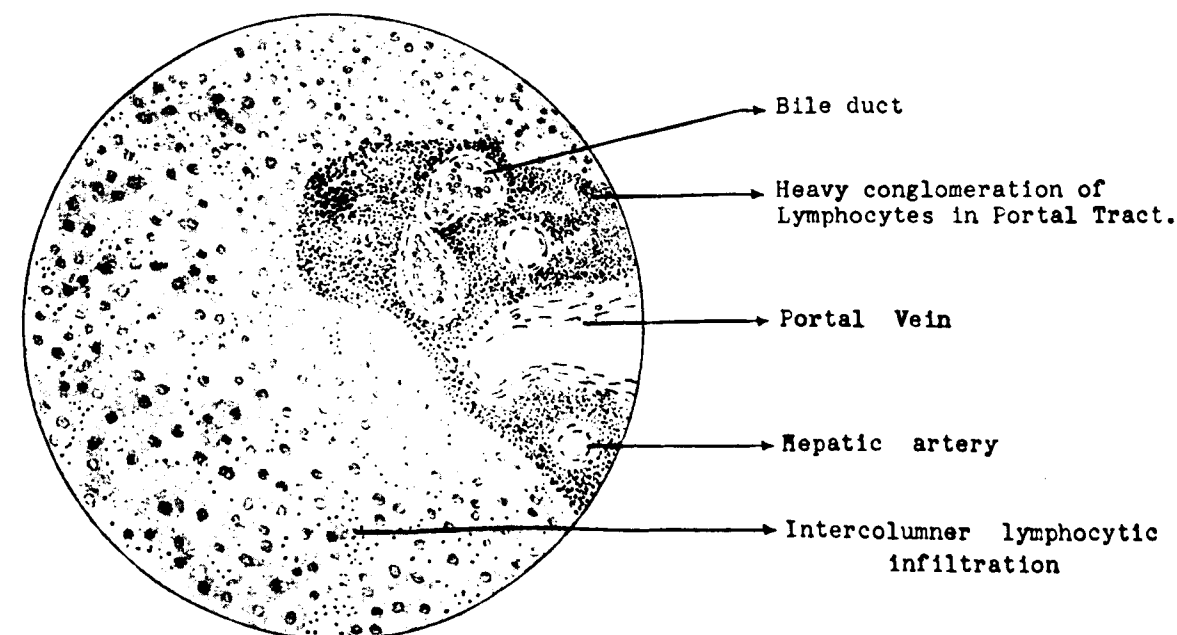


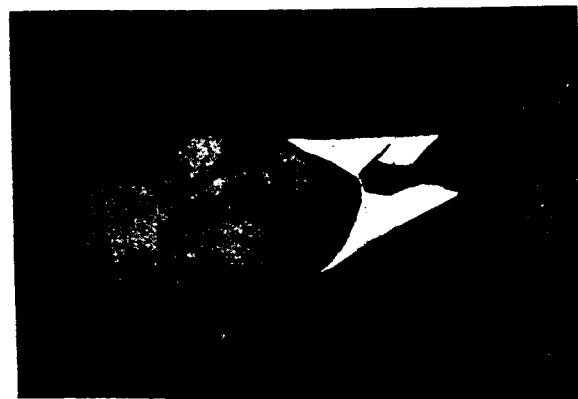
FIG. II
Section of Liver showing Leukemic changes.



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LYMPHOID LEUKAEMIA IN DOGS

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Even though the lymph glands are spotted in their early stage for swelling, not much notice of it is taken as the animal seems to be quite normal otherwise. Some extra-careful owners may consult the veterinary surgeon when usually symptomatic treatments are carried out. It is only when the glands show unusual swelling and the animal starts wasting badly that a serious notice is taken of. From this stage the condition usually takes a rapid course and terminates fatally. Besides the direct action of the lymphadenosis, death may be due to intercurrent diseases, ulceration of the leucocytic foci etc.

Clinical symptoms may vary in details but fundamentally these are same in all patients and arise from lymphadenosis. Cherry ('40) records that the most noticeable symptom he found in a dog was the greatly enlarged head, specially, in the region of the submaxillary lymph glands. From this gland he was able to tap out greyish white purulent material with rather fetid odour. He also reports that during the initial stage the swelling of the glands used to disappear at periodic intervals of a week or two.

White ('46) states that almost all the lymph nodes are eventually grossly enlarged; the spleen is readily palpated; there is often diarrhoea and sometimes cough; wasting is considerable. There may be local oedema of the throat.

Atkinson ('41) gives clinical record of a case as—temp. 103.8°F, pulse 68/ min., respiration 30/ min.; suprascapular, prefemoral, inguinal, popliteal, submaxillary and mesenteric lymph glands enlarged and oedema along the sternum.

Innes *et. al.* ('46) state that a lymphatic phase proceeds to a systemic one; there are progressive anorexia with diarrhoea in some cases and loss of condition which may advance to definite emaciation in a few days. There are respiratory signs of polypnoea and dyspnoea and the cardiovascular system exhibits tachycardia. There are eye changes. The termination phase is marked by very rapid wasting of skeletal muscles for two to three days before death when anorexia is complete.

It has been noticed by the present author that practically every patient kept up an appetite surprisingly disproportionate to the general character of the disease. In some cases the appetite even became pronounced. Two cases were seen where the dogs were so weak and emaciated that they could hardly walk. In spite of that they were eating their normal diet and seemed to want more. It is, however, to be stated that on odd days they used to be definitely off food and again becoming normal eater on the following day. In the advance stages there was difficulty in swallowing, no doubt, due to the pressure of the swollen glands.

It has been seen that the condition of the bowel movement is not uniform and fixed. As a rule it is loose and sometimes takes the character of typical diarrhoea. Constipation, however, is not uncommon.

Some authors have described some form of an eye affection in this disease. Innes *et. al.* ('46) have seen changes in the eye, either as the accumulation of white cells in the anterior chamber or as actual haemorrhage into the chambers of the eye with temporary interference with vision. Bloom *et. al.* ('45), however, state that they could not find any such haemorrhage.

The present author has noticed eye affection in all cases mainly in the form of a thick muco-purulent discharge which collects all around the edges of the eye lids but mostly concentrating in the inner canthus. Such discharge has at times been very severe and proper treatment had to be resorted to. In many, but not all, cases there were some form of haemorrhages in the various structures of the eye.

In one particular case the eyes were found to be in an alarmingly bad state with complete loss of vision. The history in this case was rather extraordinary. A few months before the animal was taken ill, one afternoon, its eyes went suddenly red and the animal was absolutely blind and was found to be unresponsive to all forms of stimuli applied to test vision power. The condition disappeared within about quarter of hour, that is, almost as suddenly as it came. The dog was then perfectly normal. During the time of its illness (leukaemia) it developed eye trouble at a very early stage and within about ten days went completely blind; the eyes were then looking miserably frightening. This complete blindness remained till its death and no amount of treatment did improve the condition of the eyes. On examination it was found that there was accumulation of a thick fluid in the chambers of the eye, together with haemorrhages. Microscopic examination of the fluid revealed presence of large number of leukocytes, the lymphocytes being comparatively numerous. There were haemorrhagic spots on the outer covering (cornea etc.). In between these spots there was opacity, no doubt, due to the pressure inside the chambers of the eye.

Temperature.—Varying reports are available as to the rise of temperature in this disease. While some investigators report a fairly high rise of temperature others report that the temperature remains practically normal. One has found a definite rise of temperature in every case. In some animals the rise is to a small degree while in others the rise of temp. is considerable. As peculiarities observed in such cases it may be mentioned that a high rise of temperature may be followed by an automatic remission for a few days and then the temperature goes up again. In certain cases one has tried various febrifuges and also drugs like sulphonilamide and penicillin in order to lower the temperature but there had been no response;

at the same time, there have been instances of spontaneous abrupt remission in those cases. In one case (see graph) a fairly high temperature was recorded almost continuously for more than two months. In spite of this, the animal ate well and only suffered from those disabilities incidental upon the swelling of the various lymphatic glands.

In human beings, fever is stated to be almost an invariable feature only in acute conditions. The temperature however, does not run a characteristic course and may be intermittent or continuous.

Haematology:—It is generally stated that the blood picture usually shows a heavy increase in white blood corpuscles mainly due to a comparative increase in the number of lymphocytes. There is also a decrease in the number of R.B.C. resulting in anaemia, especially at the later stage of the disease.

The ratio of white to red blood corpuscles changes from 1:700 to 1:5 (Berndt, quote H.M.). The normal leukocyte number of about 13,000 may go up to 320,000. Again, the relative lymphocyte count may go up to 2 to 4 times the normal 25%. Most of these are lymphocytes of small varieties, especially in chronic cases. These lymphocytes are in most parts abnormal. Piney (1932) states that the normal azurophil granules are absent in these cells. But according to Maximow and Bloom (1939) these granules are not a constant feature in normal lymphocytes, unlike the granules of granulocytes. Other abnormalities include certain changes in the chromatin granules of the nuclei. The cytoplasm may be abnormally basophilic. Sometimes immature lymphocytes (lymphoblasts) may be present in large numbers. The presence of many such lymphoblasts signifies a high degree of acuteness of the condition.

It should, however, be stressed that no two cases show an identical change in the blood count either relatively or totally. Thus, a considerable variation is seen in the blood picture recorded by different authors in different cases; that is to say, that there is no known haematological specificity.

From the various reports and also from one's own experience it appears that there is a special relationship between the intensity of the lymphocytosis and the extent of overgrowth of the lymphadenoid tissues in the body. The reasons for such variation and also the causes of the peculiar feature in some cases of leukaemia where no apparent haematological changes take place, are not fully understood. It is, however, possible that in different patients the extent of illness vary and as such there is variation in the degree of involvement of structures both qualitatively and quantitatively; hence, the production or otherwise of certain types of cells in individual cases.

TABLE I

Authors	Cherry ('40)	Atkinson ('41)	Bloom <i>et. al.</i> ('45)		Innes <i>et. al.</i> ('46)		Present Author.		Normal*
			Case I	Case II	Case I	Case II	Case I	Case II	
Erythrocytes	6,325,000	6,634,000	3,370,000	4,490,000	3,650,000	8,460,000	6,851,500	3,660,000	7,340,000
Leukocytes	26,050	56,040	2,500	76,800	282,000	14,200	60,150	37,250	12,600
Eosinophils	—	—	X	2.2%	—	—	4.6%	2%	10%
Basophils	—	0%	X	X	—	—	0.5%	2%	> 1%
Neutrophils	—	45%	—	—	3%	—	—	—	57%
Segmenters	—	—	14.0%	66.0%	—	32%	37.0%	28%	—
Nonsegmenters	—	—	65%	12.2%	—	37%	5.3%	32%	—
Lymphocytes	—	43%	12.5%	7.4%	56% Small 22% Large	14%	47.4%	27%	25%
Monocytes	—	6%	1.5%	11.2%	19%	8%	4%	3%	8%
Normoblasts	—	—	4.5%	0.2%	—	—	1%	2.5%	0.6%

*Figures taken mainly from Duke's "Physiology of Domesticated Animals" (4th revised Edition)

On the other hand, it is quite a known fact that there may be automatic periodic changes in the cellular contents of blood in certain cases of leukaemia. The different authors may have recorded findings at such times of variations and this may account for such dissimilar haematological findings.

It would, certainly, be very helpful if it were possible to establish an uniform blood picture in leukaemia. Certain factors, however, may be considered as fairly constant, such as

- (1) the presence of abnormal and immature white blood corpuscles ("a shift to the left").
- (2) generally a positive increase of W. B. C. count.
- (3) lymphocytes are comparatively higher in number.
- (4) total haemoglobin content is lowered.

The figures given in Table I illustrate the wide variation in haematological changes in different animals suffering from leukaemia.

Postmortem Findings.—All microscopical changes arise mainly due to proliferation of lymphadenoid tissues in various organs; also due to perivascular and scattered deposits of lymphocytes in other organs.

Generalised increase of lymphadenoid tissues takes place in the lymphglands, follicles of spleen, stomach and intestine, the tonsils and the bone-marrow. Accumulation of lymphocytes occur in the liver, lungs, kidney and in various glands.

Most striking feature in lymphoid leukaemia is the great enlargement of lymph glands. In this respect no particular glands seem to have any special affinity for the disease. It has been observed that as a rule the swelling of the glands is bilaterally symmetrical though exception to this has been seen. Practically all the lymphatic glands are affected. Quite striking are the submaxillary, prescapular, precrural, popliteal and the mesenteric glands. The latter can easily be palpated as a hard mass.

The next noticeable feature is the great enlargement of the spleen. The substance of the spleen is very soft. It is impossible to distinguish between the splenic pulp and the follicular areas. Some authors have reported cases where spleen has not been found to be visibly affected [Innes *et. al.* ('46); Cherry ('40)]. In every case examined by us the spleen was found to be enormously enlarged. There was subcapsular haemorrhage of varying degrees in most of the cases.

Splenomegaly is stated to be a constant feature in all late cases. The weight of the spleen may increase up to 15 times the normal weight.

The liver is usually enlarged. A case has been reported by Cherry ('40) where the liver was found to be practically normal. In all cases

autopsied by us the liver was found to be greatly enlarged, the comparative increase being greater in larger breeds of dogs. The organ was found to be quite firm with rounded margins.

Regarding kidneys, although microscopic lesions were observed in every case, excepting in one instance, the kidneys were not appreciably enlarged. There were nodular structures (lymphomatous growths) of different sizes in the walls of the stomach and also of the intestines. In one case ulceration of the mucous membrane was quite visible.

A fair amount of oedematous fluid was found both in the thoracic and the peritoneal cavity in all carcasses.

Histopathology:—Here again the histological changes of organs are mainly due to lymphocytic proliferation and lymphocytic infiltration. Practically every organ of the body is infiltrated with lymphocytes. The organs mainly examined were the liver, the spleen and the lymph gland. The following observations are recorded.

Liver:—There was heavy conglomeration of lymphocytes (mainly small) in the portal tract. There were also lymphocytes migrated into the cellular establishment where they were found thinly invading the space between the cell columns. No metalympic cirrhosis was noticed. Haemosiderosis was noticed in all cases.

Spleen:—The whole of the internal substance of the organ seemed to consist of densely packed lymphocytes. The usual demarcation and differentiation of splenic tissues were practically absent.

Lymph glands:—These organs were found to have completely lost their normal structure and the usual medullary and cortical portions were indistinguishable. The fibres as are present in the capsule and in the trabeculae were seen to be separated into layers by the infiltration with lymphocytes. Germ centres were absent; at least these could not be recognised as such. There were many reticulo-endothelial cells in a state of engorgement with erythrocytes.

Treatment

There is nothing on record to show that leukaemia in dogs has ever been cured either spontaneously or with the aid of any treatment.

There have been attempts made to treat this condition on the line of treatment followed in human medicine.

In human patients, too, no cure has yet been possible. Some good results have, however, been obtained in trying to give comfort and in prolonging the life of the sufferers.

Certain drugs have been used as palliative measures.

Piney (1932) states that arsenicals and ferruginous waters may do good. Heliotherapy (exposure to sunlight, natural or artificial) may be tried if the disease is recognised before the general condition becomes too serious. Exposure to splenic region appears to be most beneficial and a well-marked temporary improvement may follow. The author further writes that artificial induction of malaria and protein shock have been tried but with no useful results. In his opinion Benzol, which is leucocytotonic, is of some use but it has a greater effect on a myeloid than on a lymphoid tissue. Surgical removal of large masses of lymphatic glands may only diminish patient's discomfort but does not change the course of the disease. Splenectomy has doubtful value but blood picture does improve and the condition may remain subleukaemic for 2-3 years. X rays are the most useful agents and has given the best results—although it is mostly useful against myelosis.

Price (1933) in his book "Practice of Medicine" notes that symptomatic relief has followed treatment with lugol's iodine.

Journal of Amer. Med. Ass. (1948) quotes that complete body irradiation with radio-active Phosphorus (P^{32}) may prolong the life and give comfort.

Mathews (1950) gives certain results obtained on a trial of β -Naphthyl-di-2-Chloroethylamine (R 48, related to nitrogen mustard) in leukaemia and allied diseases in men. The author reports that no response was obtained in two cases of acute leukaemia in adults. In two out of three cases of myeloid leukaemia there was good remission. Out of four cases of chronic lymphoid leukaemia good remission was noticed in two. In the latter cases leukocyte count dropped, Hb. content rose from 35% to 90%; there was shrinkage of spleen together with general reduction in the size of lymph glands. It is further reported that although the patients were not fully cured they were able to work. It is, however, to be noted that such remissions were short-lived.

The drug (R 48) was given by the mouth in tablet form, each tablet containing 100 mg. Daily dose did not exceed 300-400 mg. which were given in divided doses.

Craver (1948) reviews the recent advances made in the treatment of leukaemia and allied disorders. With regard to chemotherapy the author states that nitrogen mustards, urethane and stilbamidine seem to act as palliative and may prolong the life. But the results obtained are irregular and all these agents are associated with toxic effects. In his opinion radio-active isotopes also seem to be palliative.

Haddow (1947) states that urethane (Ethyl carbonate) does produce remarkable changes in leukaemia. In most favourable cases the result is

manifested by (1) a fall in total leukocyte count to a normal level (2) a tendency for the differential count to be nearer normal figure (3) diminution in the size of the spleen and lymphnodes and by (4) a rise in haemoglobin content. There is, however, no indication of any permanent benefit.

Almost all of the above mentioned agents have been tried in animals, especially, in dogs.

Hutyra, Marek and Manninger ('46) recommend arsenical preparations (Fowler's solution) to be administered with intermission and given in increasing doses for 1-2 wks. at a time. Xray therapy, they report, has given good result in all types of lymphatic leukaemia. This is to be applied for long periods using rays of medium penetration. It is further stated that Radium and Thorium—'X' treatment can be used instead.

White (1946) states that at Dr. Haddow's suggestion, Mr. G. C. Knight has treated three cases with Urethane but, although, there was, at the beginning, some improvement of general condition the lymph glands remained enlarged and the disease later went on as in the case of untreated animals.

Innes *et. al.* (1946) report on results obtained in one case of leukaemia in a dog after treating it with urethane.

The reaction appeared in the form of a dramatic remission, as the authors call it. According to them there followed spectacular improvement represented by the improvement of the general condition, reduction of number of leukocytes, decrease in total leukocyte count, an increase of red blood corpuscle count and by much reduction of the size of the enlarged lymphatic glands. This improvement, however, was followed by relapse, the condition getting much worse within about two months after the marked improvement was first noticed.

The authors comment that urethane has a depressant action on the formation of leukocytes in general and lymphocytes in particular.

As far as can be ascertained no detailed records of results on the use of arsenic, benzol and iodine in leukaemia in dogs are available. These drugs have, however, been used as palliative measure. Similarly, no detailed study of the effect of deep Xray therapy has been recorded. But the latter will probably give the same beneficial effect as is noticed in the practice of human medicine.

The present author has used both arsenic and Lugol's iodine in a number of cases but there has been no appreciable change in the course of the disease. Sulpha drugs and pencillin had no effect either, except in two

instances where the use of sulphadiazine did temporarily reduce the body temperature. But there again it is difficult to say with any surety whether or not it was the drug that was responsible for this reaction.

Treatment with Oestrogen

This method of treatment was tried for no vital reasons but mainly because there was not much one could do in these cases. At the same time one was taking into consideration the possibilities of a relationship between sex hormones and tumour-like growths.

It has been established that certain types of neoplasms arise as a result of some hormonal (sex) disturbances. Further, such hormones have been used as chemotherapeutic agents in certain types of growths. That is to say, that evidences are available to show that the endocrine system and their hormones affect both the development and regression of neoplastic growths.

Herrold (1941) reports the results obtained in 12 cases of carcinoma of the prostate glands which were treated with diethylstilboesterol. There was relief of pain often occurring soon after the institution of the therapy. In some cases stabilisation or recession of the prostatic carcinoma was accompanied by improvement in general physical condition and in some instances by a gain in body weight.

As regards relations between the sex hormones and lymphomatous growths Gardner *et. al.* (1940) report development of lymphoid tumours in mice receiving oestrogen. Some of these tumours were of leukaemic variety.

Silberberg M. and R. (1945) have shown a relationship of sex glands in experimental leukaemia of mice. Burmester and Nelson (1945) report the effect of sex hormones upon incidences of lymphomatosis in chicken. The author states that castrated males have a higher incidences of lymphomatosis than normal controls. Further, the males and capons treated with male hormone had a significantly lower incidence of lymphomatosis than the untreated males and capons. It is thus suggested that male hormones increase the resistance of males and capons to lymphomatosis. Conversely, deficiency of male sex hormone is a factor favourable for the development of this condition.

Davis *et. al.* (1950) have investigated the possibilities of relationship of sex hormones with visceral lymphomatosis. The authors have observed higher incidences of both spontaneous and experimental avian lymphomatosis in castrated males than in normal males.

Subject :—9 years old male Afghan Hound.

History and symptoms:—The animal was brought in a bad state of health; weak, emaciated, all palpable lymph glands including the mesenteric glands greatly enlarged; enlarged liver and spleen could be easily palpated; temperature between 102.4 to 103.8, pulse 90/min., resp. 45/min., slight diarrhoea, appetite normal, heavy muco-purulent discharge from the eye. A tentative diagnosis was given as Lymphoid Leukaemia.

Blood examination on the next day (18.7.49) showed—R.B.C.—6,851,500; W.B.C.—60,150; neutrophil—segmented, 37.0%; nonsegmented 5.3%; lymphocytes 47.4%; monocytes—4%; eosinophils—4.6%; Basophils—0.5%.

Treatment:—On and from 20/7/49, a course of penicillin treatment was started. This had absolutely no effect. The temperature still continued to be between 102.5 to 103.5. The animal was, however, eating well. Arsenic treatment was tried but with no appreciable result. The general condition of the animal was going from bad to worse. The range of temperature was now varying between 102.8 to 104.0°F.

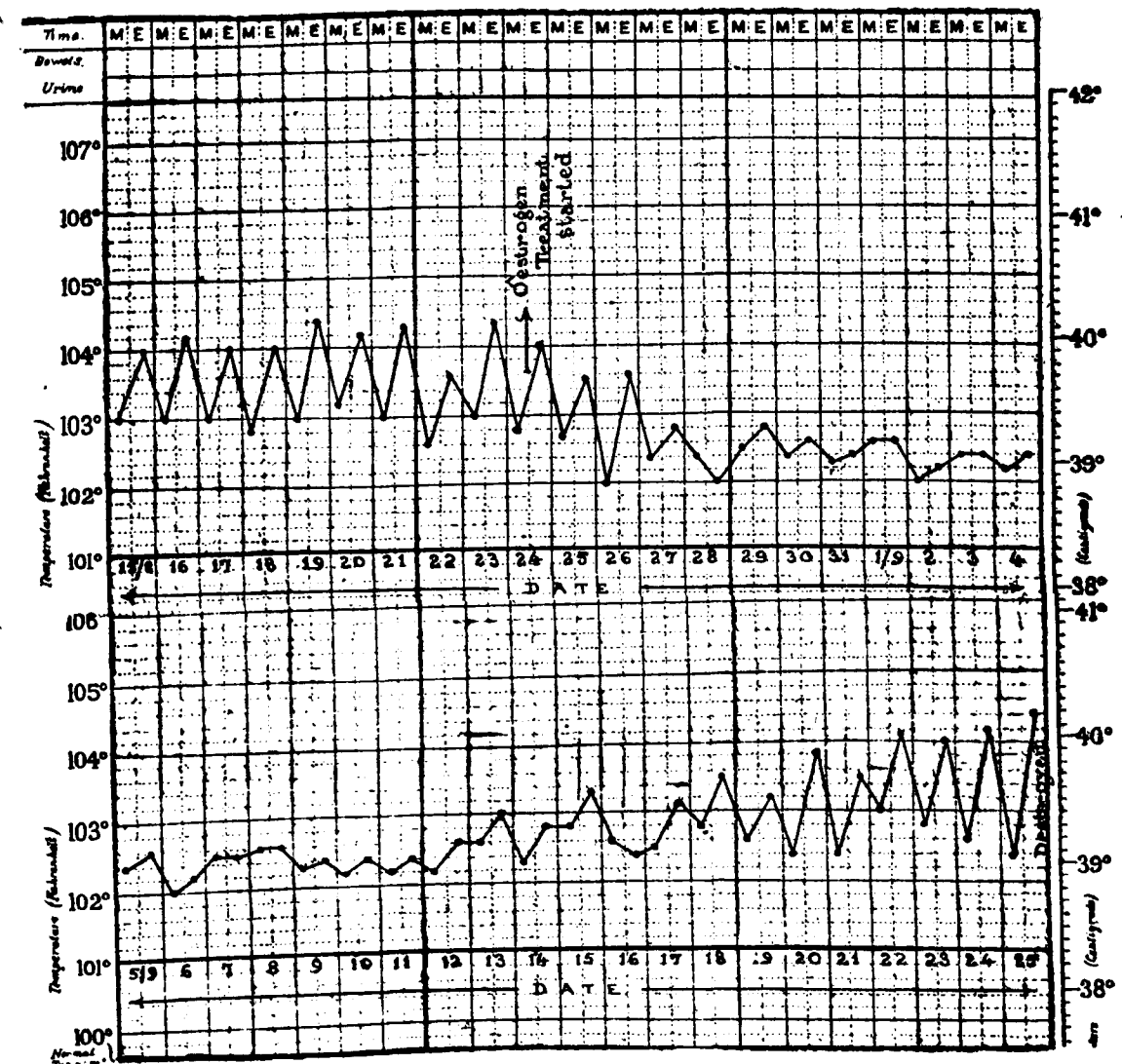
On 24-8-49 it was decided to give a trial with stilboestrol (Dihydroxydiethylstilbene), for reasons already stated above; that is, for no reasons at all.

A dose of 2 mg. was given by the mouth once a day. A close observation was kept on its general condition and also on the daily temperature variation. The actual rise of temperature did not seem to be of much interest but the difference between the morning and the evening temperature was striking. After the administration of the drug this difference gradually became narrower and after about a week there was practically no difference, which is most unusual even for a normal animal.

On 30-8-49 the blood picture showed—R.B.C.—7,403,000; W.B.C.—28,085; neutrophils—60%; lymphocytes—31%. Thus the total blood count though not normal was lower than before. Similarly lymphocyte count was decreased while the neutrophils came up to near about the normal number.

The general condition of the animal was much improved; after a long time it was reported to have had a quiet and restful night and wanted to go for a walk on its own initiative. The discharge from the eyes, which has hitherto been rather troublesome, had almost disappeared. Respiratory trouble was much relieved though there was no appreciable change in the actual size of the enlarged lymphatic glands.

This apparent improved condition was maintained up to about 11-9-49. From that date the difference between the morning and evening temperature started to increase and so did the total rise of temperature



Temp. Chart of the treated case showing (a) a continuous high temp; (b) effect of Stilboestrol on the diff. of M/E temp.

On 22-9-49 there was a severe breakdown in the condition of the animal and it was rapidly deteriorating. Now it was refusing food which has never been the case so far.

Blood examination on 22-9-49. revealed R.B.C.—7,032,150; W.B.C.—59,068, neutrophils—37%, lymphocytes—49%.

The animal was destroyed on 26-9-49.

Discussion

In the opinion of the author this disease of dogs exists in India not so sparingly. Larger types of breeds where special mention can be made of Gt. Danes have been found to be the more frequent sufferers.

The treatment with synthetic oestrogen has given a reaction which seems to be of some importance. One does not, however, claim any spectacular result from it. The result has not, in author's opinion, been even encouraging but the reaction set up cannot be altogether ignored. Apparently, the animal has shown some improvement in general condition. The blood picture did swing towards the normal mark although not to a very appreciable degree. What did strike one was the change in the total difference between the morning and evening temperature.

It should, however, be mentioned that according to the findings quoted above one was expecting an immediate aggravation of the condition as it was a male dog. But for some reason or other this came after an initial phase of apparent improvement. It would be interesting to find out the results of the effect of correspondingly similar sex hormones i.e., by using male hormone on male dogs and female sex hormones on female dogs.

Summary

1. Lymphatic Leukaemia in dogs in India has been recorded.
2. Detailed records of some of the cases have been presented.
3. A brief review of the disease from its various aspects has been given.
4. The effects of a synthetic oestrogen administered in a case of lymphatic leukaemia, where atleast a suggestive reaction has been noted, are recorded.

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TEMPERATURE REACTION IN RABIES DUE TO "FIXED VIRUS"

By

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In naturally occurring cases of rabies it has been observed by certain workers that there is a rise in the body temperature. Hertwig, Monin and Balla (1) found the temperature raised 1° to 3° C. in the maniacal stage but in the paralytic stage it was several degrees below normal. Pfiel (1) found it highest in the initial stage of the disease, the pyrexia sometimes continuing till death and sometimes the temperature fell rapidly to normal shortly before death. Lote (1) recorded that in artificially infected dogs the temperature in the first half to three days is raised and falls afterwards. On the other hand, according to the same author, in rabbits infected with rabies the temperature begins to fall with the onset of the disease and remains low till death. In the initial stages of the disease in man, there is said to be a slight rise in temperature and in the excitement stage it may rise upto 103° F., becoming very high before death (2).

The present work was undertaken to find out the temperature reaction in rabies due to the 'fixed' virus. The animals observed were sheep used

for Anti-rabic Vaccine production at the Punjab Veterinary College, Hissar. Morning temperature of these animals was recorded daily from the day they were injected with the fixed virus to the day they were destroyed. The strain used was original Pasteur's Paris Strain of the 'fixed' virus, received from the Central Research Institute, Kasauli. The virus is maintained by cerebral passage from rabbit to rabbit. Approximately 0.75 c.c. of a 5 percent emulsion of the rabbit brain 'seed' in normal saline is inoculated intracerebrally to each sheep (3).

Symptoms in inoculated sheep:—The inoculated sheep, after an incubation period of 6 to 8 days, show symptoms of tremors, butting the face in the corners of the pen, rapid masticatory movements as if chewing the cud and staggering. After remaining in this condition for a day or so, the sheep lie down and ultimately are completely paralysed. When moribund they are destroyed.

Observations made:—In all observations were made on 43 sheep. Out of these, 5 sheep died from other causes. Another 5 sheep failed to show any symptom as also the temperature reaction and were reinoculated second time after about a fortnight of the first inoculation. From the 38 sheep thus observed through all the stages, a large number showed a typical rise of temperature 4 to 6 days after the day of inoculation. The symptoms in such cases were seen 6 to 8 days after the day of inoculation. A few cases showed a rise in temperature 7 to 8 days after inoculation, in which the symptomatic reaction was also delayed to the same extent.

TABLE 1

Showing the rise in temperature in sheep due to 'fixed' virus.

Initial temperature			Minimum rise			Maximum rise		
Average	Min.	Max.	Average	Min.	Max.	Average	Min.	Max.
102.3° F.	100.6° F.	103.6° F.	104.5° F.	103.0° F.	105.6° F.	105.4° F.	104.8° F.	107.2° F.

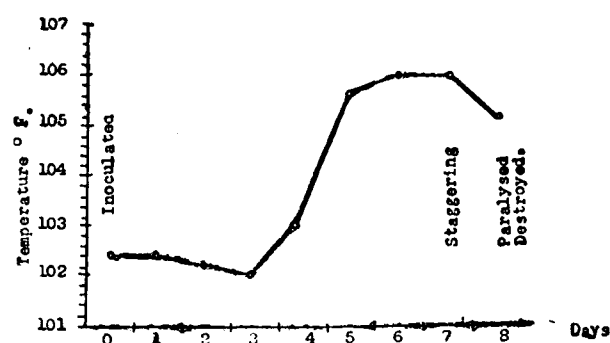
From Table 1, it will be gathered that there was an average rise of temperature by two to three degrees Fahrenheit from the initial temperature, and that pyrexia persisted till the destruction of the animals in the paralytic stage, i.e., for 3 to 4 days.

There was no appreciable fall in temperature with the onset of paralytic stage as observed by certain workers in the natural cases of rabies. 18 cases showed no fall, 7 a fall of less than one degree and the rest a fall between one to two degrees Fahrenheit from the maximum temperature. Table 11 gives the details of all the cases observed and Graphs 1 and 2 the typical curve of rise in temperature.

TABLE II

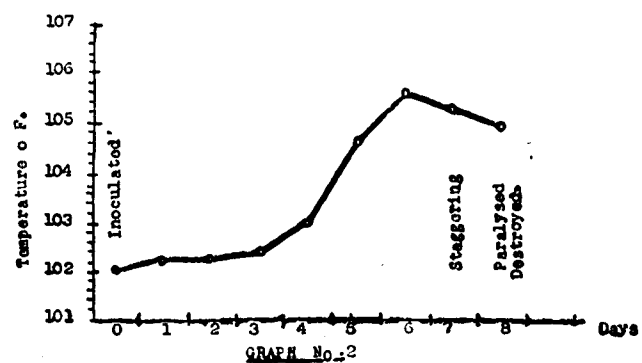
Showing the temperature reaction in sheep due to the rabies "fixed" virus.

Sheep No.	Average initial temperature °F.	Day of rise of temperature	Minimum rise °F.	Maximum rise °F.	Duration of rise of temp. days.	Fall, if any, before death °F.	Day of showing symptoms.	Remarks.
1	3	4	5	6	7	8	9	
27	102.2	8	104.0	105.6	2	—	8	
28	102.2	5	104.6	106.2	4	2.0	7	
29	102.0	5	103.0	104.8	4	2.0	8	
30	103.6	7	105.2	105.6	3	1.6	7	
31	102.0	4	104.4	105.6	4	2.0	6	
32	102.0	6	104.6	105.6	4	2.0	9	
33	102.2	2	Atypical as explained in the text.			—	—	
34	102.2	6	104.6	105.6	3	1.0	7	
35	103.6	—	Atypical as explained in the text.			—	—	
36	102.6	5	106.0	106.0	3	1.8	6	
37	102.0	4	103.6	105.6	4	—	6	
38	103.2	5	104.6	105.0	3	1.0	6	
39	102.2	5	104.6	105.8	4	—	7	
40	102.2	4	104.0	105.6	6	2.0	8	
41	103.0	8	105.0	105.2	3	1.8	9	
42	Died due to debility.							
43	103.4	6	105.6	106.2	4	—	8	
44	102.0	5	104.0	106.4	6	1.0	9	
45	103.0	7	105.6	105.6	2	—	7	
46	102.2	4	103.4	105.4	4	—	8	
47	102.0	4	103.2	105.4	6	—	7	
48	102.6	7	105.4	105.4	4	—	9	
49	Atypical as explained in the text.							
50	102.0	7th day after the second inoculation	105.0	106.0	6	0.8	11th after the second inoculation	Reinoculated on the 13th day.
51	Died due to spinal puncture while inoculating.							
52	—	—	—	—	—	—	—	Reinoculated on the 13th day.
53	102.0	5	103.8	105.6	3	—	8	
54	102.6	5	105.0	107.0	4	—	8	
55	102.4	11th. day after the second inoculation	103.8	106.6	till death	—	8 after the second inoculation	Reinoculated on the 15th day.
56	Died due to debility.							
57	Died due to tympanites.							
58	102.0	6 after the second inoculation	104.0	105.4	4	—	8 after the second inoculation	reinoculated on the 14th day.
59	102.6	6	105.4	106.4	3	—	8	
60	102.2	5	105.0	105.0	3	2.0	7	
61	101.8	5	103.0	105.0	3	—	7	
62	100.6	6	104.4	104.4	3	1.0	8	
63	102.4	5	105.4	105.6	3	2.0	7	
15	102.0	4 after the second inoculation	104.2	106.8	5	—	8 after the second inoculation	reinoculated on the 15th day.
64	103.0	8	105.6	105.6	2	—	8	
65	102.6	6	105.2	106.2	4	0.8	9	
66	102.4	5	105.0	105.4	3	—	7	
67	102.6	4	104.6	106.0	4	—	7	
68	102.2	5	105.6	106.0	4	0.8	8	



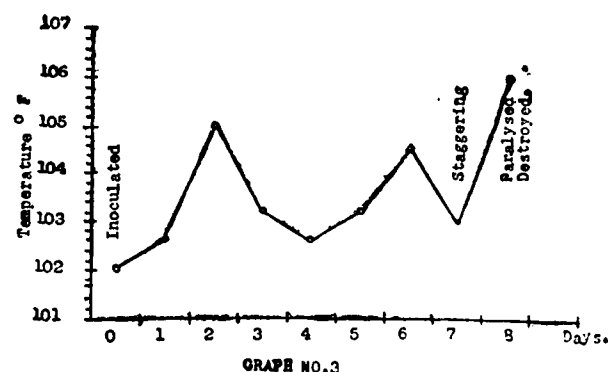
GRAPH No. 1

Showing temperature curve of sheep No. 68 after inoculation with rabies "fixed" virus.



GRAPH No. 2

Showing temperature curve of sheep No. 39 after inoculation with rabies "fixed" virus.



GRAPH NO. 3

Showing temperature curve of sheep No. 33 after inoculation with rabies "fixed" virus.

Particulars of the three cases that showed a typical temperature reaction are :—

1. Sheep No. 33 showed an abrupt rise of temperature to 105°F., two days after the inoculation, after which the temperature curve was in a zig-zag fashion. (Graph 3).

2. Sheep No. 35 had an initial temperature of 103.6°F. The temperature remained oscillating between 103.6°F. and 104.6°F., till the animal was destroyed after it had shown typical symptoms.

3. Sheep No. 49 showed a rise in temperature on the 8th day after inoculation which persisted for 5 days without showing any other symptom. It was reinoculated on the 13th day after the first inoculation. The temperature after that showed a daily decline for 5 days from 105° F. to 101.8° F., when it showed the symptoms of rabies and was destroyed the following day.

Conclusions

From the above it may be concluded that :

1. Cases of rabies due to the "fixed" virus show a rise in body temperature ranging between two to three degrees Fahrenheit, about two days before the onset of symptoms.
2. This rise in temperature persists for 3 to 4 days; and
3. There is no appreciable fall with the onset of paralysis.

Summary

1. Temperature record of 43 sheep infected with rabies "fixed" virus is made.
2. 5 sheep died due to causes other than rabies.
3. 35 sheep showed a typical rise in body temperature about two days before the onset of symptoms, and this rise in temperature persisted till paralysis and death.
4. 3 sheep showed atypical rise in body temperature.

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THE FEEDING OF DOGS

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The dog is a carnivore like a wolf, jackal, cat or a tiger and, as the name implies—flesh devouring, his natural diet consists of food constituents derived from animal kingdom. Meat foods, including fish, eggs, milk, flesh—raw or cooked—etc., constitute the staff of his life. He need not, however, be fed exclusively on flesh unless his task happens to be exceptionally hard as that of sledge dogs in the bitter cold of the far north, and a majority of these animals adapt themselves to a non-carnivorous diet quite readily under domestication and other unnatural conditions of life. Family dogs, for example, soon learn to relish a great variety of eatables just as man learns to relish tobacco, beetles, wine or pickles. For pet dogs, cereals and vegetables form a useful and valuable adjunct to meat dietary. It does not, however, follow that these should be used to the entire exclusion of meat foods. The mongrel dogs of India are well known as feeders of anything out of necessity, if not by choice.

There is no doubt about the fact that all foodstuffs, whether derived from the vegetable or animal kingdom, are essentially the same, in as much as they contain all the elements necessary for the growth and function of the animal body, but they may not be similarly digestible in different species of animals. In dogs, the major part of digestion is gastric, while in the herbivores, the intestinal functions are paramount, the stomach functioning merely for the preliminary preparation of the food for more important intestinal actions. In dogs, mastication or salivary digestion is not of great vital importance as is the case in the herbivores, and therefore, the dogs bolt their food and swallow it.

The kind and form of meat given to dogs is not of so great importance as its necessity. Raw meat is preferable to cooked meat, and fresh meat to stale. Beef is, perhaps, the best for dogs, although for the sake of variety and to meet certain requirements, lamb, mutton, horseflesh, etc., may be substituted. Fish, if fed to dogs, had better be boiled so that bones may be easily picked out before feeding. Fish is easily digestible, yet not so nourishing as other meats. If cooked meats are fed, they had better be roasted or boiled, and not fried. Canned, smoked, salted, spiced and dried meat preparations, as well as pork, are all an eyewash for dogs, and should be withheld from their dietary as they are decidedly detrimental to their well being. Milk is a

fairly good substitute for meat to a certain extent. The objection against it is that it gives excessive bulk, but, still, its virtues cannot be overlooked, especially for the pups. It is, of course, indispensable as a food for the sick, with or without eggs. For adult dogs sour milk is better than sweet milk but most dogs need to be educated to it to relish it. Some people believe that 'milk breeds worms'. Fortunately there is no foundation for this fallacy. Eggs, preferably raw, are also very useful, but they are an expensive substitute for meat.

By way of caution, idiosyncracies of certain individuals to certain types of fleshy foods must be taken into consideration. Certain meats are ill-borne by certain individual dogs, while the same are taken with impunity by other dogs. Whatever the case, one point is certain, and that is, that there are more dogs suffering from want of meat than there are those that have suffered or ever will suffer from its consumption.

Large raw bones should always be allowed to the dogs. Gnawing them improves the condition of the teeth. They also supply the animal with the additional amount of the necessary mineral salts, such as, calcium, phosphorus and iron. This is more important for the metabolism of a puppy. Dogs can, as a rule, grind up and digest small bones but there is always a danger of their lodgement in the alimentary canal. In view of this, small splintery bones, such as rabbit, game or poultry bones, should be avoided as far as possible.

Among the most acceptable vegetables for the dogs are tomatoes, spinach, lettuce, carrots, onions, etc. They all contain an abundance of all the known vitamins, so essential in every diet. Carrots must be mashed and boiled, but other vegetables may be given raw or cooked. As for cereals, whole wheat is best. Cornmeal, barley, polished rice, oatmeal porridge etc., are all unsuitable. Domesticated dogs kept in unnatural surroundings do not enjoy the privileges of exercising their forces of instinct and appetite in the selection of their food, as is the case in wild dogs for whom these forces serve usually as safe guides. Pet dogs, therefore, begin to like all sorts of odd eatables. Some would even relish fruits, which are not harmful though seldom beneficial. Potatoes, candy, chocolates, highly seasoned foods from the table, etc. prove always harmful. Carbohydrates, in general, if fed in larger quantities to dogs, are very liable to produce systemic disturbances due to their heating proclivities, and should therefore be avoided.

Most people in India, more especially the vegetarians, imagine that meat diet tends to make dogs vicious. This is a superstition. Viciousness and peevishness develop as a result of bad treatment and unnatural conditions, which, on the other hand, are directly caused by unnatural diet. If the laity could only learn to exercise a little good judgment in the selection of proper foodstuffs for their dogs, and could, in addition, manage to allow a reasonable amount of regular exercise to their pets, a whole train of ailments of these

lovable creatures would be kept away. The four essentials for dogs are milk, meat, sunshine and exercise.

Ordinarily a normal dog should be at his best at 5 to 8 years; at 12 he should be vigorous; at 14 to 18 he generally becomes senile and infirm. Dogs fed exclusively on vegetable diet get old at 8 and if such vegetable diet happens to be very liberal and contains sweets, he is likely to become grossly fat, which is a cruelty to the poor animal. Sleekness and slenderness in adult dogs is a healthy condition, and not necessarily indicative of starvation as some misguided people think. Obesity, on the other hand, is an abnormality and predisposes the animal to different skin troubles, rheumatism, partial blindness, shortness of breath, wheeziness etc. These infirmities render him a helpless, useless and above all a pitiable creature. A lady's lap dog is generally over-fed because the owners have the mistaken notion that the only way to make a dog happy is to feed him lavishly. It is important to know that the dog's happiness depends more upon the liberty to use his legs than on the freedom to overfill his stomach with unnatural foodstuffs.

Foul breath or pyorrhoea is another fell disease common to pet dogs. This is caused by one or more of several things, eating decomposed carcasses, soft foods, vegetables, sweets, indigestion and infectious diseases. Wild animals seldom suffer from this trouble as they are instinctively able to select their proper food. Improper functioning of teeth brought about by failure to use teeth, as nature intended they should be used, means lack of proper circulation of blood in the part and therefore early decay. Closing the jaws tightly on a hard bone or gnawing a tough piece of tendon, forces the teeth down on the pulp in their sockets and forces the blood out. Relaxing the jaws allows fresh blood to flow back into their structures and nourishes them. Soft sloppy foods like vegetables, candy or other sweets do not require vigorous use of the teeth, and gradually lower the vitality of the part until they succumb to infection which is always present in the mouth. Pyorrhoea results with all its attending ills. It is true that if the gateway is muddy, the interior is bound to get dirty.

Improper feeding is a direct cause of many ailments of dogs, such as rickets and obesity and a contributing cause of a number of other troubles like eczema, diabetes, fright disease, etc. It lowers the natural resistance of the animal to disease and by so doing increases their susceptibility to a whole group of infectious diseases when contracted. Any master who is indifferent to the dietetic needs of his unfortunate dog or is ignorant of his requirements for proper nutrition, in a way, opens up a whole box of ills for his pet.

Again, the diet of dogs should consist of not only starchy foods, meat foods, fat and mineral salts, but it should also contain the essential vitamins. Over-boiling of the diet should be avoided as it destroys the vitamin content, if any, present in it. In dog dietary there are four very important

vitamins, A, B, C and D. Vitamin A is important from the point of view of the general health and growth of the animal. The yolks of eggs from properly fed poultry are rich in Vitamin A. Liver is also an excellent source. Cod-Liver oil and other fish-liver oils are the richest sources of it. It is also present in the milk of cows or other lactating animals fed on rations rich in vitamin A, as yellow corn, ripe peas of green varieties, carrots etc.

Vitamin D is important in the prevention of rickets. Cod-liver oil is again the richest source of this vitamin.

Deficiency of Vitamin B is responsible for constipation, rheumatism and the paralysis of the hind legs. The coat may become rough and bad, sore places may appear around the feet, ears, or, anywhere on the dog's body; joints may become painful and stiff; the tongue may become furred and the animal may lose his appetite. Giving the dog with these conditions proprietary medicines as 'Vitamin B Complex' tablets or 'Canomax' will do wonders.

Vitamin C is present in fresh fruits and fresh vegetables, but the dog apparently does not show much deficiency of it.

No dog requires feeding more than twice daily, a lighter morning meal at about one in the afternoon and the principal evening meal at about seven or eight in the night. The latter is given heavy to keep the dogs quiet during the night. Watch-dogs, however, should get their principal meal in the middle of the day. Feeding should be regular and no tit-bits need be given at odd moments during the day. As to the quantity of the food to be given, much depends upon the size and age of the dog along with the kind or work expected of the animal. As a general rule, a dog requires to keep him in condition half to three-fourths of an ounce of food per day for every pound he weighs.

The following abbreviated outline of the methods of feeding and rearing dogs which have been found satisfactory may, perhaps, be of some help:—

Stud Dogs:—Dogs at stud require a liberal diet, two-thirds of which should consist of raw or under-cooked meat. Tonics and stimulants may occasionally be required to maintain the dogs' strength and breeding efficiency.

Whelping Bitch:—It is not necessary to alter their diet for the first two or three weeks of pregnancy. After the fifth week food should be given frequently but in small quantities to avoid over-loading the stomach by a heavy meal. A fair amount of meat should be given, especially to the larger breeds, but the bitch should not put on extra amounts of fat. Lactol and Lactol-biscuits may also be added to the menu as their vitamin D content enables the expectant mother to assimilate the Calcium and Phosphorus salts in her food. This gives the newly-born puppies sound bones, firm flesh and the foundation for good teeth.

After the puppies are born, the mother should be fed on milk alone which should be given in small quantities every two or three hours. A bowl of it should be kept by her side for the night. On the third day, biscuits (preferably Lactol) mixed with milk or gravy may be given. After the third day, some boiled fish or stewed rabbit or a little meat may be given with soaked biscuits, rice or bread. Later on, ordinary diet may be given with an extra allowance of meat and milk. As the puppies grow larger, this allowance may be increased to facilitate the nursing mother to give more nourishment to the young ones.

Young puppies:—Amongst puppies there is an extra-ordinary high percentage of deaths due to injudicious feeding. When the puppies are about 3 weeks old it is advisable to teach them to lap a little milk with the idea of facilitating the process of weaning. It will be found that they do not require much coaching. A little later, they may be coaxed with some finely scraped raw meat. Even at this stage voracity will be found to be the chief feature of their table manners.

After the puppies have been fully weaned, say when about a month old, it is recommended that they be given 3 meals a day, plus a drink of fresh milk first thing in the morning and last thing at night. With the early morning drink, mix a little Cod Liver-Oil, say half a teaspoonful per puppy to begin with, gradually increasing to a tablespoonful (in the case of large dogs) as the puppy grows. Cod Liver-oil and the Calcium salts, preferably Osteo-Calcium Tabloids, are important for their bone-building and strength giving properties. Bigger-breed puppies grow at a prodigious rate, and it is essential to see that their strength and vigour increases proportionately with their size.

The three meals can consist of some good puppy meal or bread, scalded with hot soup, gravy or milk and mixed with raw meat or finely minced half-boiled meat. The meat, of course, must be given cold, and should not be sloppy, but scalding is advised in order to swell the puppy-meal before-hand. Raw meat should form an important part of the dog's diet and is always to be preferred to cooked meat.

As an occasional alternative, the meal may be mixed with cooked fish trimmings which are excellent for the purpose and the bones boiled soft or removed. As the puppy grows, dry biscuits (preferably Liver Biscuits) should be given as one of the three meals, while bones (but not those of poultry, game or rabbit) may also be given to keep the teeth in good condition. An occasional raw egg, beaten up in a little milk is always a good tonic, and cooked green vegetables have a definite value as blood purifiers. If the young puppy is brought up well on some such lines as mentioned above, and if at the same-time, he is given plenty of gentle exercise, it will be found that he will grow like a weed. After 9 months of age, 2 good meals a day will be sufficient. Finally, it may be added that all puppies ought to be dosed for worms at about six weeks of age and thereafter every three months or so.

*Puppy Feeding Schedule (In relation to breed & age).
Puppy patent Foods: 'Horlicks', 'Oster Milk', 'Lactol' & 'Glaxo'.*

Breed.	Age of the puppy.	Amount per Feeding.	Water in Fluid Ounces.	No. of Feeds in 24 hours.	Suggested times of feeding.	Remarks.
<i>Small Breeds.</i> Fox Terrier Dachshund, Pomeranian, Sidney Silky Spaniel etc.	1-2 weeks 3-4 " 5-6 " 7-8 "	Level Teaspoonful $\frac{1}{2}$ -1 $\frac{1}{2}$ -1 $\frac{1}{2}$ -2 2-3	Oz. 1-2 1-2 $\frac{1}{2}$ 2 $\frac{1}{2}$ -3 3-4	7 7 6 5	6 a.m., 9 a.m., 12 noon, 3 p.m., 6 p.m., 9 p.m., and 12 mid-night. *Omit mid-night meal. **Omit 12 noon and 12 mid-night meals.	When using the puppy patent foods for the first time, give it to the puppy for several feeds slightly more diluted than the directions specified and gradually increase the strength of the solution till it complies with the schedule. It may be necessary to alter the amounts per feed and the number and frequency of feeds according to the requirements of each individual pup, upon the advice of the Veterinary Surgeon. It is advisable to add Cod or Halibut Liver Oil to the above feeds occasionally to avoid Rickets or Dental Caries. The puppies can safely be fed with a feeding bottle with a rubber nipper in the early stages but when the sharp teeth come up, they damage the nipper, which is economically unsound. They should be allowed to take milk in a clean little bowl themselves.
<i>Bigger Breeds.</i> Alsation, Hound Labrador, Retriever etc.	1-2 weeks 3-4 " 5-6 " 7-8 "	$\frac{1}{2}$ -1 1-2 2-3 3 $\frac{1}{2}$ -4	1-2 2-3 3-4 4-5	7 7 6 5	As above " " "	

Proprietary Dog Foods, like 'Oster Milk', 'Horlicks', 'Lactol', or 'Glaxo' give good results but are expensive. Necessary directions for their preparation and use, according to the age of puppies, are given in the appended chart.

Orphan puppies:—If the bitch dies when the puppies are born or before they are weaned, they may be successfully reared by hand on milk. The quantity to be given must, of course, vary with the size of the puppies and should be from 20 drops to two teaspoonfull, every two hours during day and night.

Weaning of puppies is an important item in the feeding of dogs. A large number of puppies when sucking the mother, will certainly pull down the health of the mother, and they themselves may not get sufficient milk to build up their bodies. Any surplus puppies should, therefore, be disposed of, to be looked after by foster mothers. This is essential only upto the age of 2-3 months. Later, they become used to artificial feeding.

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AGING OF CERTAIN CROSS-BRED GOATS BY MEANS OF PERMANENT INCISORS

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The estimating of age is essential for the valuation of live-stock. As in the case of other animals, the age of goat is determined by the growth of the teeth. Goats like the cattle have only a set of lower incisors which is a chief guiding factor for the estimation of age. The literature on the subject is very meagre and only a few workers have described the significance of the incisors in reference to the age of the goat.

Turner, *et al* (1937) describe that at about one year the central pair of incisors is shed and is replaced by two large teeth. About the 24th month two more large teeth appear. Then from third to fourth year there are six permanent teeth and in four to five year there are eight permanent incisors.

De Valois (1942, cited by Paul) writes that during the first year the goats have baby teeth. The first pair of permanent teeth appears in the second year, the second pair in the third and the third pair in the fourth year. A goat of four to five years of age has a complete set of permanent teeth.

Bhatia (cited by Paul) found that a central pair of incisors was shed and was replaced by two larger permanent ones at the age of about one year. The second pair appeared at the age of 20-24 months. In the third year two more teeth were cut and in the fourth year a goat had a complete set of permanent incisors.

Paul (1946) describes that at 15 months the first pair is cut and may be well up, the second pair of permanent incisors is cut at the age of 21 months. At about two years and nine months the third pair of permanent incisors is cut and comes into wear within three months. According to him a goat becomes full mouthed at about the age of four years.

Methods and Materials

The paucity of literature on the one hand and the significance of the results obtained on the other prompted the authors to write up this note.

During the course of observations one hundred and forty mouths were examined. The goats examined comprised the breeding stock raised to meet the demands of various sections of the Institute. The exact date of birth of these animals being known, the progressive growth of the incisors was observed at varying intervals. The goats were cross-bred progeny of hill with Barbari bucks or of plain with Barbari bucks. The housing and the feeding conditions of the animals were almost uniform throughout the period of observations.

It has been observed that the first pair of temporary incisors is shed at the age of twelve months and a permanent pair appears at 12th to 18th month. The second pair is shed at 14th to 17th month and is followed by permanent ones at an age varying from 18 to 25 months. The third pair is shed at about 21st to 28th month and permanent incisors appear in 21 to 29 months. A goat is full mouthed at an age of 29 to 35 months.

Further, there was no appreciable difference in the time and the growth of permanent incisors of the two different breeds (Plain cross 93 and Hill cross 47) of the goats used. The results of observations conducted are presented in Table I and Figures 1 and 2.

FIGURE 1

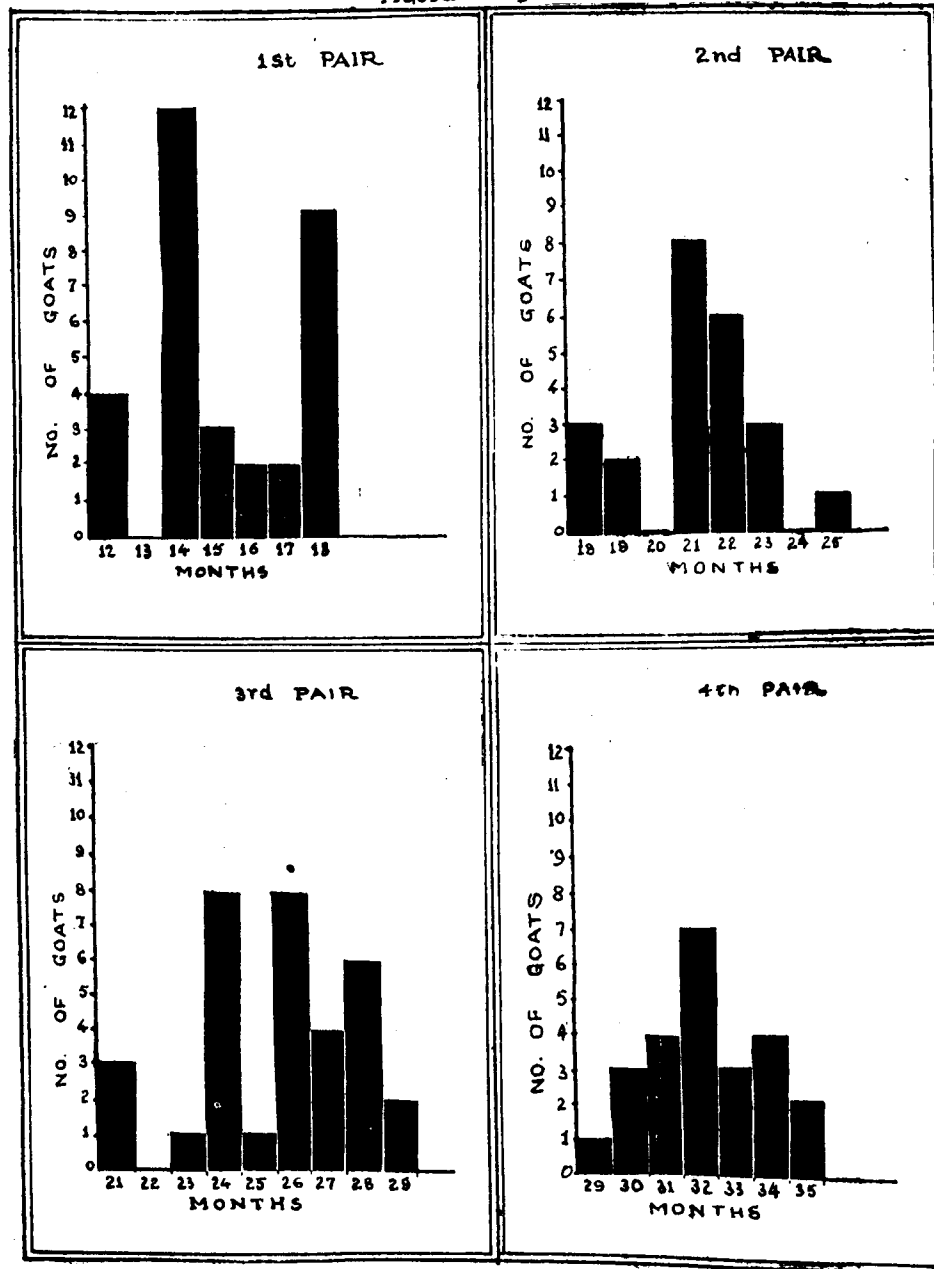


FIGURE 2

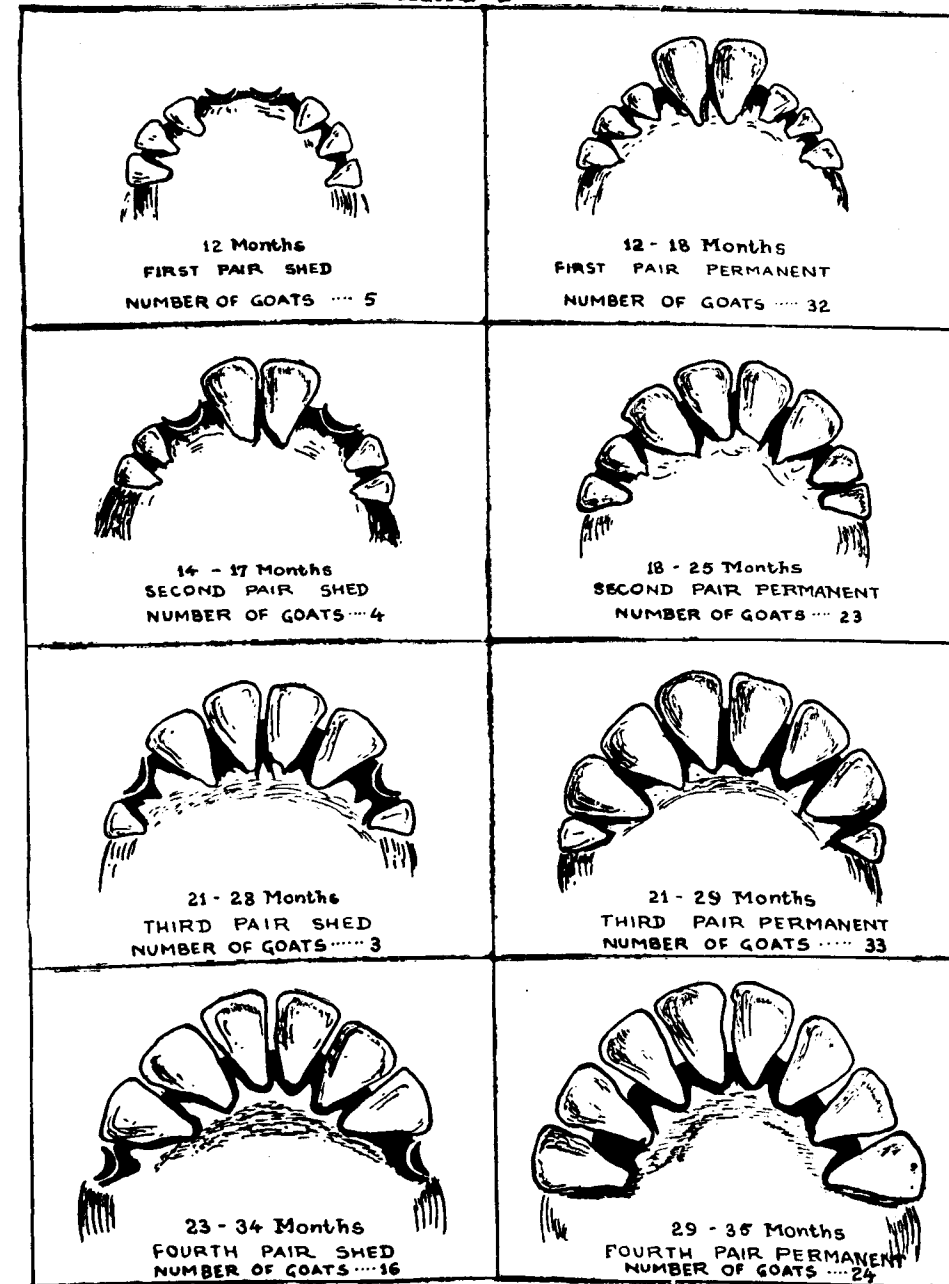


TABLE 1

Frequency distribution of ages of goats at which their 1st, 2nd, 3rd, and 4th pairs of incisors become permanent and the statistics of the distributions.

Number of goats of said age at which the stated pair of teeth becomes permanent.				
Age, months	1st pair	2nd pair	3rd pair	4th pair
12	4	—	—	—
13	0	—	—	—
14	12	—	—	—
15	3	—	—	—
16	2	—	—	—
17	2	—	—	—
18	9	3	—	—
19	—	2	—	—
20	—	0	—	—
21	—	8	3	—
22	—	6	—	—
23	—	3	1	—
24	—	0	8	—
25	—	1	1	—
26	—	—	8	—
27	—	—	4	—
28	—	—	6	—
29	—	—	2	1
30	—	—	—	3
31	—	—	—	4
32	—	—	—	7
33	—	—	—	3
34	—	—	—	4
35	—	—	—	2
Total number of goats.	32	23	33	24
Mean (months)	15.3 ± 0.37	21.1 ± 0.37	25.6 ± 0.39	32.2 ± 0.33
Standard deviation (months)	2.10	1.77	2.22	1.63
Co-efficient of variation (percent)	13.73	8.39	8.67	5.06
Range (months)	12-18	18-25	21-29	29-35

*Standard error.

Discussion:—A reference to the literature reveals that a great degree of individual variation exists in regard to the growth of the permanent incisors. So far as our observations are concerned they too indicate such variation but to a lesser extent, perhaps due to the fact that the housing and the feeding conditions of the animals were throughout uniform. The mean ages at which the first, second, third and fourth pair of incisors in the Barbari-cross goats became permanent have respectively been found to be 15.3 ± 0.37 , 21.1 ± 0.37 , 25.6 ± 0.39 and 32.2 ± 0.33 months. Except for the first and second pair as quoted by Paul and Bhatia the mean ages for the third and fourth pair are found to have been far less than those quoted by different authors. So far as our results are concerned it seems that Barbari-cross goat becomes full mouthed at less than three years of age, and this may perhaps be taken as a guiding factor for almost all the breeds of Indian Goats,

Conclusions

1. One hundred and forty mouths have been examined for the determination of age in goats.
2. A Barbari-cross goat becomes full-mouthed at an age of about three years.
3. Breed variation did not appear to exercise any special influence on the cutting of permanent incisors.

Acknowledgment

The authors express their thanks to Messrs. S. Sen M.Sc., and M. C. Tewari for the statistical calculations and sketch work respectively.

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FOWL MALARIA

By

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Danilewshky (1885) first noticed pigmented parasites in the blood corpuscles of birds, but Grassi and Feletti (1890) were the first to recognise the occurrence of true malarial parasites in English sparrows. Since then different species of *Plasmodium* have been reported to occur in birds from all over the world. Brumpt (1935) was the first to discover *Plasmodium gallinaceum* in the blood of a chicken in Indo-China and again in the same year in a chicken in Ceylon. Since then malaria has been reported in domesticated fowls from various parts of the world.

Experimental

On 29th July, 1949, while making a blood study on a White Leghorn cockerel suspected for the blood form of Avian Leucosis Complex, the presence of what appeared to be schizonts of *Plasmodium gallinaceum* was noticed in the blood smear. The identification of the parasite as a *Plasmodium* was easy from the pigmented nature of the schizonts and also from the fact that the schizonts of *Haemoproteus* do not appear in the peripheral blood.

(Paper read at the 37th Indian Science Congress Association 1950, Section of Zoology and Entomology).

The blood of the bird presented the following picture:—

Erythrocyte count	...	935,000 per c.m.m.
Leucocyte count	...	20,200 „ „
Differential count	...	
Monocytes	...	25%
Neutrophiles	...	25%
Lymphocytes	...	48%
Basophiles	...	1%
Eosinophiles	...	1%

In the literature with regard to the blood count in anaemia due to Avian Leucosis Complex, as well as from the statistics in this laboratory, there are rare records of such low erythrocytic counts and the percentage of lymphocytes is usually greater than in the above report. So in order to confirm that the blood parasite was *Plasmodium*, transmission was tried in fowls of different ages by blood inoculations from the field case. Between three to nine days, average seven days, the inoculated birds showed the parasites in the peripheral blood, in their various forms viz: the amoeboid or ring form, trophozoite, schizonts and gametocytes were demonstrated in the experimental birds. In two cases impression smears from the spleen of dead birds from the experimental lot also showed the parasites.

On August, 23, 1949 a second field case was received from the same source, a White Leghorn cockerel, and, as in the first case, the comb was very yellow and anaemic, and *Plasmodium* was seen in the blood of this bird.

In the present study it is noticed that fluctuation of body temperature is a normal phenomena of the disease. A thermal rise is not a guide to the presence of the parasite in the peripheral blood. When innumerable parasites are seen in the blood the bird may succumb. There is a drop in body temperature before death, sometimes becoming subnormal. But in adult birds, as in both of our field cases, the parasite disappeared and reappeared in the peripheral blood at intervals till ultimately no parasite could be demonstrated and the birds looked healthy.

Birds which died in the acute phase of the disease after showing the parasites for a few days in the peripheral blood, showed enlargement of spleen. Anaemic condition of the visceral organs and the musculature were also present. Liver and spleen were slaty in colour. In one case heart showed gelatinous pericarditis.

Basu (1938) reported the natural occurrence of malarial parasite in a pond heron or paddy bird of 24 Parganas (Calcutta). He has named the parasite *Plasmodium heroni*, N. Sp. Basu in 1944 gave the findings of his investigations of *Plasmodium gallinaceum* for which he got the strain from Guindy

(Madras). But a natural case of *Plasmodium* in fowls had so far not been recorded in this country, from the available accounts.

The present strain is maintained at this Institute and further work is in progress.

Summary

Occurrence of natural cases of *Plasmodium gallinaceum* in exotic fowls has been recorded for the first time in this country at Izatnagar Poultry Farm.

Acknowledgment

The authors gratefully acknowledge the confirmation of the findings by Dr. B. C. Basu, Entomologist, Indian Veterinary Research Institute.

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A NOTE ON THE PARAMOUNT NECESSITY OF INCLUDING LIVE-STOCK SCHEMES IN THE GROW MORE FOOD CAMPAIGN*

By

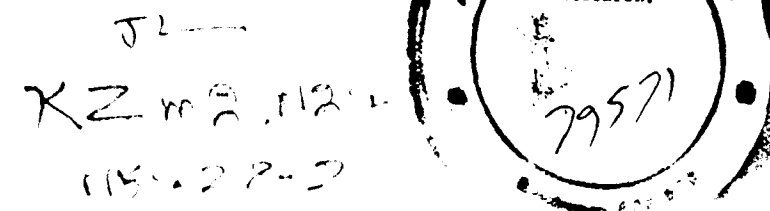
SRI HARJAS RAI,

Director of Animal Husbandry, Ajmer.

Even before the outbreak of War II, India was deficient to some extent in food supplies and had to depend upon imports of cereals like rice etc. from Burma, Siam and other countries to meet her requirements. But during the War, on account of a variety of causes into which we need not dwell now, these imports stopped and the position became more accentuated. To meet this situation the Indian Council of Agricultural Research sought to prepare in June 1944 a Memorandum defining the actual needs and the means for the attainment of the objective which was described as "the maximum production of food *both of the cereal type and of "protective" nature* so as to meet not only the basic needs of the present and future population of India but to reduce imports to the largest possible extent".

This policy was enunciated after an estimate of the country demand in various foods had revealed that whereas the cereals and pulses

*A note presented to the meeting of the Indian Council of Agricultural Research.



were short of the total demand by only 10 to 20%, some of the 'protective' foods like milk, meat, eggs, fish etc. had to be increased by at least 250 to 300% with a view to bring the dietary of the nation on sound lines.

To give a practical shape to this plan of all round food-improvement, the Government of India announced, in 1946, an all India policy for Agricultural Development and Food procurement and, based on this, each Province and State was asked to prepare a self sufficiency plan in which the following items pertaining to Livestock and Animal Husbandry were recommended for inclusion.

- (1) The development of fisheries,
- (2) The increase in milk production,
- (3) Improving the quality of the plough and the milch cattle, the sheep, and the goats by the establishment of breeding farms and the distribution of selected animals for breeding,
- (4) Development of Gowshalas,
- (5) Increasing the quantity and quality of cattle feed. Increased production of oil seeds so as to make oil cake available as cattle feed and manure.
- (6) Protection of cattle against disease.
- (7) Developing the dairy and the poultry industries.

Some of the provinces and the areas directly administered by the Government of India accordingly prepared schemes of livestock development on these lines and these were financed from the Grow More Food Campaign launched by the Govt. of India at about the termination of the war. Later, for reasons, best known to the Govt., but presumably to give these schemes a different nomenclature, the Government of India classified some of these schemes under the "Post-war Development Plan". Most of the Live-stock development schemes, excepting those pertaining to fisheries development were thrown into the latter category.

While some of these schemes were still continuing the Government of India was confronted with a worsening of the food situation in the country and sought to rectify it by reorganising its Grow-More-Food Campaign (1948) in which, while fixing targets of production for cereals for the various States, the Government thought fit to eliminate practically all the livestock development schemes (except fisheries) from the Grow-More-Food-Plan. No definite reasons for the exclusion of these items are known but presumably the plan and policy of the Government was changed for meeting the immediate needs of the country in regard to cereals so as to make India self sufficient in these food stuffs and stop their imports by 1951. This step, however, as will be readily appreciated, was

not a very sound measure to rehabilitate our food economy in as much as investigations made by the Indian Council of Agricultural Research and others had already conclusively shown that the deficiency in cereals covered only a part of our real needs. It is no secret that an Indian's diet is probably the poorest diet in the world in which cereals predominate while whole milk, fruits, eggs, vegetables, meat, and fats which constitute the 'protective foods' and are so essential for a balanced diet are sadly lacking in a very large majority of our population. Even in normal times our caloric intake was much behind the other advanced countries of the West, and the lack of the protective ingredients in the food was seriously affecting the progress and development of the population. Unless, therefore, steps are taken to provide a balanced diet for the nation with all the nutritive elements required for sound health, the Government, by restricting the scope of the Grow More Food Campaign to the production of cereals, was only partially and incompletely solving the food problem. In the words of Prof. Ashby our idea of self sufficiency at present is no more than self-maintenance. Self-maintenance accepts an idea of little or no variation in food supplies, whereas self-sufficiency means, on the other hand, a diet adequate in quantity and variety. Inadequate and ill-balanced feeding is bound to cut at the root of our existence and all the ideals we aspire for.

Furthermore, in coming to this decision, the Government has not taken into consideration the paramount necessity of developing the cow and the working bullock without which no agricultural improvement is possible in this country.

As is well known India is a land of small holdings and small peasant farming is the most prominent feature of Indian agriculture. Our farmers are poor and in the majority of cases are following the agricultural practices of their fore-fathers. They are almost entirely dependent on bullock power for cultivation, irrigation and other needs of locomotion at the farm, such as carting the produce to the market etc. The introduction of mechanical means in agriculture is practically an innovation amongst the 'intelligentia' of Indian agriculturists whose number, at present, is by no means large. The tractor and the tube-wells are no doubt important but their scope is rather restricted in view of the small and scattered holdings of the majority of cultivators and their incapacity to buy and maintain tractors in working condition on their lands. Furthermore, even in the matter of covering the deficiency in cereals which, at present, is the chief objective of the Government under the Grow More Food Campaign, the small cultivators who constitute the large majority are likely to be more helpful in accomplishing the task than the large-scale land owners who have to depend upon the agency of the actual cultivators for tilling their land.

It is not the intention to decry the use of tractors altogether. In bringing large tracts of unbroken and weed-infested lands, a tractor is decidedly a quicker and more efficient instrument of ploughing than a bullock, but what is intended to be emphasized is the fact that while the Government and some of the rich firms are able to find crores and crores of rupees for buying tractors, and installing machinery for producing artificial fertilizers, they hardly spend a few lakhs for improving the existing natural master fertilizer—the cow—which provides the best part of our ploughing agency at present besides giving milk. Furthermore, the scientists are still divided in their opinion about the value of artificial manure in contrast to cattle yard manure. An important school of thought in this country is very emphatic in their assertion that cattle-yard manure has definitely a greater value in maintaining soil fertility and feel that investing crores of rupees in opening Artificial Manure Factories at Sindri and other places is at best only a costly experiment which the Government can ill afford to spend in the present hard times. Be it as it may, one thing is, however, quite clear. Until such time as India is in a position to procure plenty of tractors and transport vehicles and is able to construct a net work of high-ways inter-connecting the villages and the cultivators are in a position to maintain the tractors and other agricultural machinery in a working condition at lesser cost, the needs of our agriculturists will have to be met with by the ox and such a time, in the words of our President, Dr. Rajendra Prasad, is "still far away". Again, even if our agriculture had been mechanized to the full, we shall have to depend on foreign countries for fuels to work these machines and, as can well be imagined in times of war the clouds of which are hovering over the world, the supplies of these commodities are bound to go down considerably if not cease altogether. The plight of our agriculture under such a contingency can well be imagined.

Two very common arguments are generally advanced justifying the exclusion of livestock development from the Grow More Food campaign. These are:—

- (A) With the shortage of funds under the campaign it is considered necessary to concentrate on grain schemes which would directly reduce imports from abroad, and
- (B) Live-stock Development Schemes are inherently long term undertakings which would not yield immediate results.

It will be seen that these arguments go against the original policy enunciated by the Government in 1946 that it was the bounden responsibility of the Government for providing enough food for all, sufficient in quantity and of requisite quality. The least that could be said of these

arguments is that they are short-sighted in conception and definitely go against the national policy of all-round improvement. If efforts required for the amelioration of the cow and the working bullock and the impetus to produce protective foods are relegated to a secondary position, our agricultural economy as well as natural resources of food are bound to suffer. As already stated no short routes to the production of cereals alone are likely to bring any tangible results especially when the country is in dire need of milk and other protective foods for the building up of our man power and for improving the condition of the bullock and the cow. Dairy development is of course a slow process but the keeping of poultry and production of eggs can quickly augment the production of valuable subsidiary foods which are so much wanted in the country. Poultry Development can, therefore, be included in the Grow More Food Scheme along with fisheries since it is likely to yield returns in a comparatively short period and could, therefore, be called a "short-term" project.

Similarly schemes could be included under the Grow More Food campaign for the preparation and collection of hay and dried grass in the forest areas and its assembling in fodder scarcity areas so as to provide feeding for the milch and work cattle. As is well known the inadequacy of feeding is largely responsible for the poor condition of our bullocks and low yield of the cow. The introduction of artificial insemination amongst cattle is another project which should be included in the Grow More Food to offset, to some extent, the dearth of bullock power in the country. Experience gained from the Pushkar Cattle fair near Ajmer shows that compared to 1948 the price of an average bullock sold at this fair in 1950 has gone up by 32% and there is a general complaint from the buyers about the inadequacy of good ploughing bullocks available in the fair now as compared to the past years. This portends danger of shortage of bullock power which requires the urgent attention of the authorities.

In view of the above facts an irresistible conclusion can be drawn that the food problem of our country cannot be solved by concentrating on cereals alone but that an all embracing planning for the harmonious development of all branches of agriculture and Animal Husbandry as was envisaged by the Government of India in 1946 is most essential to meet our present agricultural and food problems. I would, therefore, earnestly appeal to my colleagues assembled in this august body of the Indian Council of Agricultural Research to bring to the notice of their respective Governments the paramount necessity of including some of the relevant Livestock Development Schemes in their Food Production Drive so as to bring a real and lasting benefit to our country.

MORTALITY IN YOUNG FARM STOCK

BY

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Calves of to-day represent the future cattle wealth of the country. High mortality in calves is always associated with a corresponding reduction in milch cows and bullock-power of a few years later. One must, of course, expect to stand some loss in calves and, if the loss is not too high, it will have to be tolerated in the present state of our knowledge. Under the best conditions obtaining in some of the dairy farms in Europe, the lowest mortality figure in calves runs around 5 per cent. In one of the well-established dairy farms in Delhi, it was found that out of 834 calves born during 1936-1947, one hundred had died, giving a mortality rate of about 12 per cent. In two military dairy farms in India, where some investigations were carried out, the mortality rate was around 26 per cent.

The present 'grow more cattle' scheme will be meaningless if the calves produced die away unchecked in great numbers. The present milk shortage in India will be a permanent situation if we cannot devise means of overcoming such an abnormal mortality in the young stock. Let us now consider the causes of this mortality together with the methods of its prevention or reduction.

The primary cause of mortality in calves in some of the important farms in this country is infective in origin, so much so that the disease may properly be labelled 'calf pyo-septicaemia'. Losses in calves of day-old to a few months in age are due to this condition. A wide variety of pathogenic micro-organisms acting either singly or in combination may cause this disease. The most important among these are streptococci, staphylococci, corynebacteria, salmonella, pasteurilla and coliform organisms.

Another underlying cause is nutritional in origin particularly with reference to vitamin A and B supplements and the possibility of mineral imbalance. In the urban areas, milkmen, in their anxiety to obtain as much milk as possible, milk the cows dry and thus cheat the calf beyond its capacity to survive. A good many good calves are lost to the future generation in this way. Helminthic and protozoan parasites such as ascarid worms and coccidia play their part in killing off some calves.

Some calves that are highly susceptible fall easy victims to the bacteria which occur very widely in nature. Such susceptibility facilitates easy entrance of bacteria into the blood stream and the defensive mechanism of the body offers no resistance to the invading bacteria. Such

animals show high fever and a short period of illness followed by death in a day or two. In some cases acute diarrhoea ensues when it is called 'scour' of the new-born calves. In calves which have a little more resisting power the invading bacteria settle down in different parts of the body such as the joints, lungs, kidneys, liver, brain and navel and set up local inflammation. Depending upon the organ affected, different symptoms such as swollen joints and lameness, pneumonia, diarrhoea, dysentery, etc., are noticed. When the joints are affected, the disease is called 'navel ill'; when the umbilicus is affected it is called 'navel ill'; when the intestines are affected diarrhoeic symptoms ensue when it is called 'scour'. All these forms are commonly met with in calves and foals.

In 'navel ill' the umbilicus is hard and swollen with ulcerated edges and on pressure yields pus or a thin blood-stained material. In 'joint-ill', the knees and hock joints are usually affected. Abscesses may be found in the liver, lungs, kidney, brain and other organs and corresponding symptoms ensue. In intestinal affections severe colicky symptoms may occur besides diarrhoea and dysentery. When the brain is affected, symptoms such as paralysis, rigidity of the neck and opacity of the cornea may be noticed. In the chronic metastatic form, the disease may be noticed several weeks after birth.

Calves over six weeks old when kept in over-crowded and unclean stalls develop what is called "Red scour" when there is bloody mucoid dysentery with severe straining, progressive weakness and death. This is caused by unicellular animal organisms called 'Coccidia'. Scours caused by non-bacterial agents may be caused by unwholesome food and mechanical irritants such as sand, hair and coarse straw from bedding which may be ingested.

The incidence and mortality in 'calf pyo-septicaemia' can be reduced to much lower levels by the adoption of certain therapeutic, hygienic and nutritional precautions. They are :—

Calving should take place in clean places. Special attention should be paid to the umbilicus at the time of birth. It must be aseptically tied and cut with a pair of sterile scissors and the stump well painted with tincture of iodine or, better, dusted with sulphanilamide powder. In one of the well-established dairy farms in India where a high incidence of calf-mortality occurs year after year, the author noticed that the umbilical cord in the new-born calf is shortened by illiterate gowallas by simply keeping the cord pressed for a couple of minutes between the fingers at a level above the point where it is to be cut to allow the blood to clot and then cut away with a pair of scissors that are none too clean or sterile. No disinfectant is also used at the cut end. The freshly formed clot at the cut end remains quite soft through which bacteria find

easy entry. In this farm, calves are also weaned at birth and fed with insufficient colostrum. The cows are premilked. Calves with open navel lesions are not segregated; nor are the calves with coccidial dysentery kept away from the healthy lot. The result is that the purulent discharges and dysenteric stools are licked by healthy calves and this perpetuates the infection in the young stock.

The provision of sufficient quantities of colostrum to the new-born calves is fundamental and the calf's first meal should be colostrum from its own mother. Colostrum is the secretion by the mammary glands of all mammals in the period immediately following parturition. Its ingestion in the early hours of life is necessary to ensure the well-being of calves. Apart from its laxative action which helps in clearing the intestines of all deleterious material (meconium), recent studies have clearly demonstrated that colostrum contains many important substances which are vitally essential to the new-born such as vitamins, enzymes, antibodies, essential proteins and a considerable quantity of minerals. In cattle, antibody transmission from the cow to the calf occurs exclusively by the colostrum routes and no antibody transmission occurs in the intra-uterine life of the calf. If colostrum is withheld from the calf, it remains susceptible to infection by miscellaneous micro-organisms which are harmless in those that get adequate quantities of colostrum. Antibody absorption occurs in the first 2 or 3 days of life and animals deprived of this vital substance fail to survive.

In the dairy farm referred to above, colostrum from the cow is mixed with the milk ration for all the calves and the new-born calf gets a fraction of this stuff in a highly diluted form. The quantity of colostrum the calf gets is ridiculously inadequate to protect it from the ever-vigilant bacterial invaders. If calves are to be weaned, it would be strongly advisable to give them adequate supply of colostrum in its natural concentration.

In the same dairy farm, down-calvers are *premierked*, after 9 months of pregnancy. Cows are served one month after calving and every cow is 300 days in milk after which it is dried. In the short dry period allowed, they are premierked a few days before calving. A good many advantages are claimed from premierking of cows, such as absence of milk fever, mastitis (inflammation of the udder), etc. Such premierked cows do not have colostrum of good quality and the calves born of them are denied the natural protective substances contained in the colostrum of non-premierked cows and thus they become susceptible to bacterial infection.

If cows have to be premierked, one should dose the calves with the cow's blood-serum in sufficient quantity in about 50 c.c. (about one and half ounces) given in about 4 injections as early after birth as possible. By such injections, the antibodies are transmitted from the mother to the offspring

through the blood-serum. Such calves should also get ascorbic acid and nicotinic acid as well as vitamin A for some time. Stall-fed cows have little or no vitamin A in their colostrum. Pasture-fed cows, on the other hand, have colostrum rich in vitamin A and so it is essential to turn out pregnant cows to the pastures.

Calf mortality occurs more in winter months, i.e. from November to February. So services may be so adjusted as to avoid calving in this period as much as possible. Dietetic errors predispose calves to bacterial infection by causing irritation of the bowels. Unclean milk and dirty handling aid bacterial multiplication as milk is a good medium for bacteria to multiply in. Heating of milk destroys vitamins and the essential digestive ferments and so it is advisable to give fresh milk in its natural state.

Special accommodation should be capable of easy disinfection. There should be no possible contact between sick and healthy calves. Ailing calves should forthwith be removed to a properly appointed sick-byre where they should be treated and maintained in strict isolation.

Drugs of the sulfa series have given very encouraging results in the treatment of calf septicaemia, pneumonia, etc.

Deficiencies of vitamin A, ascorbic acid and nicotinic acid in the diet of calves predispose them to diseases and so there should be an adequate intake of these supplements.

Dung and excreta of diseased calves should be effectively disposed promptly.

Fly control should be rigidly practiced in the farm premises.

The above measures, if given full effect to, will go a long way in the eradication of disease and reduction in mortality and will pave the way for the maintenance of good health and condition of the young stock.

THE INDIAN VETERINARY JOURNAL



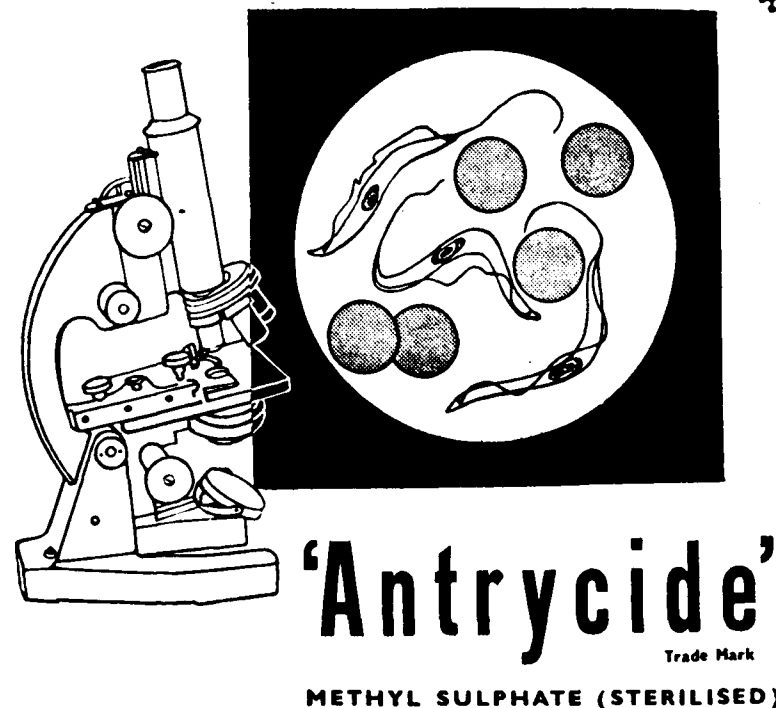
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Editorial

THE PLANNING COMMISSION'S REPORT

A national plan is, in the last analysis, a programme of action covering every sector of the economy. It is an attempt to pool together the resources available to the community as a whole and to direct them in a manner that will secure the social and economic objectives accepted by it. For this purpose, the economy has to be viewed as a unity as well as in its parts and the plan should reflect not only the links between the various sectors but also their interference.

Introduction to the Report.

The draft report of the Five Year Plan which has just been issued by the Planning Commission is a weighty document containing valuable information. It is the first report of its kind in this country and it contains several hopeful features of economic development and national reconstruction and, therefore, is deserving of 'co-operation from all groups and organisations in the country, irrespective of their party affiliation'.

The most welcome feature in the report is its emphasis on the development of agriculture, rural and cottage industries, irrigation and power supply. This is as it should be in a pre-eminently agricultural country like ours. The food crisis through which we have been passing for the past few years has brought home to every one of us the paramount necessity of increasing our resources and making us as self-reliant as possible so far as our food requirements are concerned. This fact has influenced the Commission a great deal and, therefore, in its programme for agriculture, its broad objectives for the next five years have been 'to secure an increase in the production of food

by 7.2 million tons, of cotton by 1.2 million bales, of jute by 2.06 million bales, sugarcane in terms of *gur* by 6.9 lakh tons and oil seeds by 3.75 lakh tons. The Commission has also found that 'throughout the country, agriculture and animal husbandry are complementary to each other' and has devoted a chapter for the development of cattle in the country. In this chapter, the problem has been considered under the four headings of Feeding, Breeding, Removal of useless cattle and Protection against disease. The recommendations of cattle development are on the following lines:—Mixed farming, Improving the existing pastures with better yielding and more nutrient grasses, Introduction of Key Village schemes, Establishment of Artificial Insemination centres, organisation of *Gosadans* for useless cattle, Formation of Salvage Farms for dry cows and prophylactic vaccination against Rinderpest by the extensive use of lapinised vaccine. These suggestions are very familiar to us and are very similar to those which have been advocated for a long time for adoption in the country. Their implementation has, however, been very very slow and halting mainly due to lack of finance and inadequacy of trained Veterinary personnel. Now, that the Central Government has come forward with a grant of over Rs. 3 crores for Key Village Schemes, and over a crore for *Gosadans*, we do hope that progress under these two heads would be quite spectacular in the next few years.

While these features of the Five Year Plan are very satisfactory, we are profoundly disappointed that there is no plan or scheme for an all-round intensive development of animal husbandry and veterinary science. We fear the Commission has been greatly unaware of the immense amount of wealth in our livestock and the imperative need for developing them in the general interests of the welfare of the country. We also fear the Commission has not been correctly appraised of the potentialities of the Veterinary Profession for developing the livestock resources of the country and its capacity for improving not only the *quantity* but also the *quality* of the food supply. These have been elaborately dealt with in the pages of this *Journal* from time to time and more recently during the last All-India

Veterinary Conference by Dr. Datta in his Presidential Address. There is, therefore, no need to go over these once again now. It would be enough for the present to re-emphasise that the total deficiencies in our cereal requirements are not very great and that they have been exaggerated to an alarming extent. On the other hand, the deficiencies in our 'protective' foods, which are more important for the general all round health of our people, are very great, even up to the extent of 400 to 500%.

In this connection it would be appropriate to recapitulate the following extract from the Famine Commission Report published in 1945. In his minute of dissent, Mr. Afzal Hussain, put the case for our food requirements very clearly and very succinctly in the following words:—

"Over-emphasis on cereals is misplaced, it gives an exaggerated and unnecessary importance to this source of food, and such a policy will be a serious obstacle in the path of a satisfactory solution of the food problem of India, in a manner as will improve health, raise physical efficiency, increase capacity for work and lead to better mental growth. It is abundant health, not mere satisfaction of hunger, that should be the aim of a food policy. India is suffering, and in fact has been suffering for some decades, from a very acute famine of 'protective' foods, which has brought about physical decline and inefficiency, both in men and cattle, and, if not attended to immediately, may have serious consequences in an emergency.

Regarding the production of 'protective' foods of animal origin, such as milk, the problem is undoubtedly most intricate. In fact, in the densely populated areas, proper adjustment of food and fodder balance, on which depends the production of milk, is most difficult. Under a farm economy dominated by cereal mentality, this adjustment becomes impossible. Lamar-tine Yates and Warriner criticize the cereal mentality in the following:— ".....It can and must be emphasised that grain production by itself will never give a high money outturn per acre and is, therefore, utterly inappropriate as a suitable farming for the crowded regions." They add: "By shifting the emphasis for his production from grain to livestock products, the peasant sets his feet on the beginning of a road which can ultimately lead to prosperity in a way that cereals never can." And prosperity means better diet."

The above quotation shows how imperative it is, from the stand-point of the health and welfare of the people, to shift the

emphasis from 'cereal' foods to 'protective' foods and we very much wish the Commission has approached the food problem from this angle. The need and importance of milk as an essential article of diet to our normally preponderate cereal-food cannot be over-emphasised and we wish the Commission had bestowed some thought to this aspect of the question. Better feeding of our animals by utilising our existing fodder resources more judiciously and more economically should show us an immediate beneficial effect in our milk problem. If the large volume of grass that is available in forest areas during periods of glut is properly utilised, either by their conversion to silage or to hay, and if transport facilities are afforded to shift this hay to areas of scarcity, there would be immediate relief in the total shortage of roughages to our cattle. Similarly with regard to the transport of other cattle feeds like cotton seed, oil-cake, bran, etc. Again, as we have repeatedly pointed out in these pages, if the highly valuable protein concentrate, ground-nut-oil cake, is judiciously used as cattle-feed, instead of being thrown as manure directly on the soil as at present, then it will serve the double purpose of benefitting both the starving cattle and starving soil. We would have liked it much if the Commission had recommended some concrete steps on the above lines to relieve the feed and fodder problem and even suggested a total ban on the use of cattle-feed as manure.

It is rather unfortunate that the Commission has confined its attention only to the development of cattle and has totally ignored the other farm livestock. Poultry, sheep and goats, for example, are highly valuable farm stock which contribute to a very great extent to our food requirements. Eggs and mutton are not foods which can be lightly treated. They are of great 'calorific' and 'protective' value and their availability should be made more and more, in cheap abundance. That way would have been the way to build up the health of the nation. Horses are of great importance to us to improve our transport facilities and also for our defence purposes. And, therefore, some provision must have been made to develop horse breeding in this country. This has assumed a great national importance since practically all the

horse breeding centres in pre-partition India have gone into the territory now forming Pakistan.

Again, it is a matter for profound regret that the Commission has not made any recommendation for increasing the availability of Veterinary personnel or for improving the facilities for Veterinary Research. In the past, and even now, many a livestock development scheme has been held up for want of trained personnel and many an animal disease remains undiagnosed for want of research. These conditions should not be allowed to continue hereafter. Schemes and plans must be drawn up to improve the Veterinary Education all over the country, bring it to an uniform University standard and ensure a steady passing out of Veterinary Graduates every year. Facilities must be provided for Post-graduate studies within the country. The one Veterinary Research Institute at Mukteswar should be made quite upto date and modern with all the sections fully equipped and manned. More Research institutes should be opened in different places to provide for research work on a regional basis. Plans for these and for other development research work are urgently necessary if the livestock wealth of the country were to be improved and we invite the attention of the Commission to these points so that, in their final report, they would make ample provision for them and give effect to their declared aim in planning *viz.* to pool together the resources available to the community and to direct them in a manner that will serve the social and economic objectives accepted by it.

Notes and News

AGRICULTURAL RESOURCES

A 10-Year programme of land transformation, intended to maximise India's available land, water and livestock resources, was adopted by the joint meeting of Boards of Agricultural Research and Extension held at Coimbatore at the end of July 51.

The programme, which is supplementary to the short-term schemes that are already being worked out with a view to making India self-sufficient in food, would constitute an intensive endeavour progressively undertaken to achieve definite results in certain specific directions.

The programme involves, according to the *Illustrated Weekly*, a progressive achievement of rational utilisation of land areas and the scientific development of the available resources of land, water and livestock to the maximum extent. It is proposed in these ten years to concentrate in the first instance all available funds and production aids in about 48 million acres of irrigated land selected as being specially suitable for intensive cultivation; secondly, to put under the plough 10 million acres of new or reclaimed land; thirdly, to organise an Extension Service supported by a "Bhoomi Sena" (a land army of volunteers) in at least 1 lakh out of our 5 lakh villages; fourthly, to launch a "Gosamvardhan" (cow protection) drive through the establishment of a network of key villages and key farms for breeding bulls and through the immunisation of cattle from rinderpest, providing us with 60,000 stud bulls in a year, equal to a third of the country's total requirements; fifthly, to adopt "Vana Mahotsava" as an integral part of our national life for protecting the existing forests, developing new forests and curing or preventing soil erosion by planting 30 crores of trees.

The programme, if properly enforced, will every year bring an additional 5 million acres under intensive cultivation; provide 5,000 stud bulls, immunise 50 million cattle from rinderpest; secure the planting of 3 crores of trees; and serve 10,000 villages by extension work and collective effort.

BIOLOGIST TO AID INDIAN PRODUCTION OF ANIMAL SERUMS

Mr. Oliver A. Bauman, American biological products specialist, is *en route* to India where he will advise the Ministry of Agriculture on the production of animal serums and vaccines.

Mr. Bauman is accompanied by his wife and nine-year-old son.

In India, he will join three other Point Four agricultural specialists. His assignment, which has been made by the U. S. Agriculture Department in connection with the Point Four programme, will take him to the Indian Veterinary Research Institutes at Izatnagar and Mukteswar, Uttar Pradesh, where he will aid India's programme to control livestock diseases by further improvement of modern biologicals. His services were asked for by the Indian Ministry of Agriculture.

'American Reporter'

SOCIAL WORK IN VILLAGE

The Osmania University at Hyderabad (Deccan) has, according to the *Illustrated Weekly*, launched this year a novel scheme of social service extension, which seeks to combine scientific study of the changing pattern of village life with opportunities to the students of the various faculties

to come in close contact with the people, understand their needs and problems and gain experience of practical social work among them. The scheme was inaugurated recently and is expected to continue for a period of at least three years in the village of Shamirpet about 25 miles from Hyderabad. A team consisting of more than 30 persons comprising members of the teaching staff and students belonging to the six different faculties of the University was selected for the summer camp, which will last for nearly six weeks.

The Medical and Veterinary units had a very busy time. The Veterinary unit treated 200 cases and inoculated more than 350 animals. A model poultry farm was started and several talks, illustrated with lantern slides, were given on prevention and control of cattle diseases. Advice was often sought by the villagers on the problems of cattle-feeding, dairy farming and pig husbandry.

SERUM INSTITUTE FOR BOMBAY

Bombay State will soon have a Serum Institute of its own where sera and vaccines essential for the prevention of outbreaks of cattle diseases will be manufactured on a large scale.

The institute is to be located at Aundh, near Poona, on the site formerly occupied by the Military Poultry Farm. The Government of Bombay has sanctioned acquisition of about 100 acres at a cost of Rs. 1,15,000. The institute will need over 200 acres of land.

The capital outlay of the institute will be in the neighbourhood of Rs. 5 lakhs and the annual recurring expenditure will be about Rs. 2,50,000.

'Times of India', Bombay, August, 14th 1951.

CATTLE FARM CENTRES IN BOMBAY

We understand that the Bombay Government will set up within two months three major cattle breeding centres in the State to breed pedigreed cows and buffaloes. According to the 'National Standard of Bombay', the three centres would be situated at Charodi in Ahmedabad district, at Mahud in Sholapur district and at Dharwar, and the scheme which aims at intensive cattle breeding, would cover 4,000 cattle at each of the centres besides which two more small centres of 1,000 cattle would be opened in Ahmednagar and Nasik districts.

The scheme jointly sponsored by the Central and the State Government would also open stud farms and artificial insemination centres and castrate scrub bulls in the areas to prevent their use for stud purposes.

It is also stated that the State would be able to demonstrate through private farms experimental research done at Government farms. There were already 250 such farms owned by cultivators who were willing to carry out the research experiments and, if they suffered any loss in the demonstration, the Government would bear it.

* * *

BOMBAY'S MILK COLONY

A correspondent writes to the Times of India that the Bombay Government might usefully devote more than its customary attention to the plea that the land along the Tata Tail waters is ideally suited for housing a milk colony.

The proposal emanates from the Tail Water Utilisation Committee which points out the availability of vast grazing areas, water, road and rail transport. It has long been urged that a solution of Bombay's milk problem lies in the establishment of milk colonies in the mofussil where exist all the essential natural advantages for a dairy industry.

The Bombay Government's dairy officers should set about the task of finding suitable sites for the opening of co-operative milk colonies working under the supervision and guidance of experts.

* * *

DEATH OF "RANEE"

Scotland Yard today took over the case of the murdered elephant—London Zoo's £1,500 (Rs. 20,000) Ranee—who died on July 17 from 'deliberate' lead poisoning. This is likely to be the first case of elephanticide ever to be investigated by Scotland Yard.

On July 16, Ranee carried hundreds of children for rides up and down the elephant walk. She was then in perfect health. Next morning her keeper found her dead in her cage. At first it was thought she died from gastro-enteritis but a zoo official said yesterday that large quantities of lead acetate had been found in Ranee's body after a post-mortem.

Zoo experts believe Ranee was killed by a crank as a reprisal for the shooting of a rogue elephant, Rajah, on July 9. The animals came together from India in 1945.

Scotland Yard is to make a nation-wide check with chemists in an effort to trace the sale of the lead acetate found in Ranee's body. It is believed that at least one pound of it would have to be eaten by an elephant to cause death.

"Madras Mail" 31-7-51.

* * *

TAXES ON RACES

Figures of income received by the Government of Bombay during the three years 1948-49 and 1950 by way of taxes on races were made available by the Revenue Minister, Mr. Morarji Desai, to the Bombay Legislative Assembly during the question-hour to-day.

In 1948-49, the Government collected Rs. 1,60,53,000, in 1949-50, Rs. 1,52,15,000 and Rs. 1,39,94,000 in 1950-51.

The Minister said that the number of persons arrested for betting and receiving bets on stakes during these years were 523.

* * *

MALPRACTICES IN RACING

The correspondent of 'The Hindu', Madras, writes to his paper from Canberra, on August 30, 1951, about the find of battery in a race horse saddle. It appears that an unusual performance by a hitherto ordinary horse, named Chatalot, led the South Australian racing stewards to go probing in the saddle with a pen-knife yesterday. They found what they termed the neatest battery job they had seen on a race course in twenty years.

The battery was skilfully built into the three-pound saddle. It had four tiny dry cells connected to a coil and an intricate system of covered and naked wires. Three of the cells were sewn into the lining of the nearside of the saddle and on the offside of the saddle behind the metal there was the fourth cell and the coil.

Chatalot won a race too brilliantly for the liking of the stewards. Hence their careful investigations. Chatalot was disqualified.

* * *

COW SLAUGHTER

Mr. S. N. Sujan writes in the Sunday Standard, Bombay, August 12, 1951 as follows:—

Since ancient times the cow has occupied a very important place in our economic life. She has been regarded as one of the benefactors of mankind. The humble peasant tends his cattle with scrupulous care, for they constitute his main support economically.

Babur, the founder of the Moghul Empire, abstained from beef though this was not a tenet of his faith. In his will, he gave his son Humayun the following noteworthy advice:—

"You should not allow religious prejudices to influence your mind, and you should administer impartial justice having due regard to the susceptibilities and religious customs of all sections of the people. In

particular, refrain from the slaughter of cows, which will help you to obtain a hold on the hearts of the people of India. Thus you will bind the people of the land to yourself by ties of gratitude. The propagation of Islam will be better carried on with the sword of obligation than the sword of oppression."

According to Bernier, later Moghul rulers, such as Muhammad Shah and Shah Alam, prohibited cow-slaughter. Akbar forbade his subjects to kill cows and to eat their flesh, because physicians had declared "that cow's flesh causes itch, dry scab, leprosy, elephantiasis and the like diseases, and is difficult to digest." The following Islamic observation on the cow is noteworthy: "Labanaha Ghizaun, duhnaha dawaun, wa lahmaha daun," meaning "Its milk is food, its butter is medicine (means of cure) and its flesh is disease (causing sickness)." Another Arabic quotation attributed to Aba Musa Mashari, is also significant: "Lahmul baqar daun wa haleebaha dawaun"—"the cow's flesh causes diseases while its sweet milk—fresh from the udder—is healing." The celebrated hero of Islam, Hazrat Ali, rarely partook of flesh meat and cautioned people against making their bellies "maqabir al haiwan" i.e. tombs of animals. Dr. Muhammad Hafiz Syed also points out that the necessity for cow-protection has been recognised by Muslims in Arabia, Syria, Egypt, Tripoli and Asiatic Turkey.

The cow also has some other notable merits. Her dung is an effective disinfectant, and dung cakes serve as cheap fuel. The smoke of dung fire drives away mosquitoes and other insects. Good neighbourly relations between the Hindu and the Muslim consist in mutual toleration of each other's view-point and, studied from this criterion, it should not be difficult for the latter to abstain from beef.

Muslim saints who had Hindu followers avoided beef. I can say this from personal knowledge of the kitchens attached to the dargah (shrine) of the martyr saint Shah Inayat Sufi of Jhok, and the dargah of his spiritual successor, Sayyid Mir Jan Muhammad alias Janshab of Rohri, Sind. A gesture of this sort from a Muslim will do much to bring up Hindu-Muslim concord.

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PERSONAL

RETURNED FROM ABROAD

S. Vancheswara Iyer, G.M.V.C., M.S. (Mich.).

We are glad to learn that Sri S. Vancheswara Iyer, who left India in May 1949, for Post-graduate studies abroad, has returned after completion of his studies and is now the Superintendent of the Veterinary Biological and Research Institute, Ranipet, Madras State.

While in America Sri S. Vancheswara Iyer spent a year in the Laboratories of the United States Bureau of Animal Industry at Washington, D. C. and at Beltsville, studying their line of research and production methods used in the manufacture of standardisation of various Veterinary Biological products. He also studied in the Michigan State College specialising in Brucellosis and the Dissociation of the Brucella Organisms. He utilised his stay here to take the degree of Master of Science in Bacteriology. He also visited a number of other places in America and United Kingdom and enriched himself with scientific knowledge before returning home.

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Dr. R. N. Desai, G.B.V.C., M.S. (Mich.), Ph.D. (Minn)

We are pleased to learn that Mr. Desai has returned from Post-graduate studies abroad and resumed his duties at the Banares Hindu University.

During his stay in U.S.A., he took the M.S., Degree in 1948 at the Michigan State College with Animal Husbandry as the major and Genetics as minor. He then joined the University of Minnesota and obtained Ph.D., in Animal and Dairy Husbandry with specialisation in Animal Genetics and Statistics as minor. He has also visited most of the leading educational institutions, Livestock Farms and Co-operative organisations in the Central belt of U.S.A., and on his way back has visited important places in U.K., on the Continent.

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OVERSEAS APPOINTMENT

We are glad to learn that Sri P. Krishnaji Rao, B.V.Sc., a Graduate of the Madras Veterinary College, has been appointed as Assistant Municipal Veterinary Surgeon by Penang Municipality. He left Madras during the first week of April 1951 to take up his appointment.

Sri P. Krishnaji Rao (whose elder brother, Sri P. L. Narayana Rao, is also a Veterinary Surgeon in the employ of the Madras Animal Husbandry Department) had a good collegiate career and took his degree in June 1950. We wish him good luck in his new job.

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OBITUARY

We regret to learn about the untimely death of Sri B. K. Roy, G.V.Sc., District Livestock Officer, Etawah, U. P., on 14-7-51 at the age of 47. He was a very popular officer in veterinary circles and his premature death has deprived the Department of an able and enthusiastic officer.

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Dr. Claude S. Bryan

The death of Dr. Claude S. Bryan, 43 Dean, of the School of Veterinary Medicine, Michigan State College, took place on 30th July 1951. In his death, says President John A. Hannah, Michigan State College has sustained a loss from which it will be difficult to recover. Dr. Bryan had a fine record as a research assistant and a teacher and had won professional recognition throughout the United States.

Clinical Articles

A CASE OF RECURRENT TYMPANY IN A BULLOCK

By

G. B. SINGH, B.A., M.R.C.V.S.

Director of Animal Husbandry and Veterinary Services, Orissa.

Subject:—A grey local bred bullock about 7 years old.

History:—As reported by the owner the animal suffered from chronic recurrent tympany for the last three months. He tried country medicines and later took the animal to a few dispensaries in the State but all the treatments gave only temporary relief. At last the animal was brought to Cuttack Veterinary Hospital on 29-4-51. The Veterinary Assistant Surgeon treated the case symptomatically with only temporary relief to the animal (by relieving the gas periodically with stomach tube and administering antyzymotics).

The animal was examined by me on 1-5-51 with the aid of the Cintel Metal Detector and was diagnosed to be a case of foreign body in the stomach (ferrous metal). Exploratory rumenotomy was advised to which the owner consented.

Preparation of the patient:—(1-5-51)—The skin at the site of operation and all round it was shaved 24 hours prior to the operation, thoroughly washed with hot water and soap and then with 1% Cetavlon. The site was again scrubbed with Acriflavin-in-Spirit and sterile pads soaked in Acriflavin Solution was bandaged over the site. The animal was muzzled and left in a loose box with plenty of straw bedding.

2-5-51:—As the animal was very weak, 600 c.c. of 5% Dextrosal at body temperature were injected intravenously and 8 pints of N. S. S. subcutaneously.

Anaesthesia:—40 c.c. of 2% Procaine Hydrochloride Solution were injected epidurally after injecting 4 c.c. of Adrenaline Chloride intramuscularly 15 minutes prior to epidural anaesthesia.

Technique of operation:—The bandage and the pad were removed by an assistant and the site was again thoroughly painted with Tincture Metaphane. The animal was completely draped with sterile sheets except the head and the site of operation. The site was further protected with 4 sterile towels by means of four Bachaus towel clips. A 10" long incision about 2½" away and parallel to the last rib was made through the skin which was separated from the tissue underneath and clamped with 2 sterile towels with towel clips on each side to prevent the spread of any possible contamination from the skin to the abdominal cavity. The knife, dissecting forceps and gloves were discarded and fresh sterile gloves put on. The muscles were cut by blunt dissection and bleeding checked with artery forceps and ligation. The peritoneum was grasped and cut with scissors.

Four interrupted sutures through the serous and muscular coat were placed in four places outside the line of incision in the rumen and the rest of the rumen and the opening in the abdominal wall was covered with four large sterile gauze towels soaked in hot saline. An 8" long incision was made in the rumen, sleeved arm and gloved righthand was introduced to explore the contents. All ruminal contents were thoroughly searched and a portion of the ingesta was also removed but no ferrous metal could be detected. Arm was further passed from rumen to the reticulum and a thorough search made but nothing could be detected. The reticulum was almost empty.

The gloves and sleeve were discarded, hands sterilized and fresh sterile gloves put on. The opening in the rumen was closed in three layers (a) Connell suture with Linen (b) Cushing right-angle suture with No. 1 (20 day) intestinal chromic catgut and (c) continuous lembert suture using No. 1 (20 day) intestinal chromic catgut.

The wound was insufflated with sterile granular, sulphanilamide powder and then the omentum was spread over the wound. The peritoneum was sutured with a continuous suture using No. 2 (20 day) chromic catgut and the muscles with No. 4 (20 day) chromic catgut separately. The skin was sutured with interrupted suture with coarse nylon. The incision was again insufflated with sterile sulfanilamide powder and protected with a sterile pad and oil-cloth which were kept in position by retention-sutures and bandaged.

Post-operative treatment:—Immediately after the operation Adrenaline Chloride 4 c.c. were injected intramuscularly and 600 c.c. of 5% Glucose were injected intravenously. Further, 10 pints of normal saline solution at body temperature were also injected subcutaneously. Saline and Glucose were repeated daily.

Diet:—1st day : — No diet.

2nd day : — Rice gruel, cooked broken rice, bran mash and chaffed green grass.

3rd day : — do. do.

4th day : — do. do.

5th day : — do. do.

The animal was alright till the 5th day, but on the 6th day again developed slight tympany and refused food. Antizymotics were given with little success.

7th day:—Tympany increased. Gas was relieved by stomach tube and anti-zymotics were repeated. After half an hour the rumen bloated again.

8th day:—Gas was partially relieved by stomach tube and when it was not satisfactorily relieved, trocar was passed and the cannula kept in-situ.

(i) Antizymotics were repeated.

(ii) Ruminal contents brought from the slaughter house from a healthy bullock were administered after mixing in water.

9th day:—Sutures were removed. The wound healed by first intention. But the cannula was kept *insitu*. Administration of ruminal contents was repeated.

10th day:—The cannula was still kept *insitu*. Ruminal contents administered. Temperature was normal from the date of operation till the forenoon of 10th day, ranging from 100° F to 101° F. Evening temperature 102.4° F.

11th day:—Administration of ruminal contents were repeated. Morning temperature 103° F. Evening temperature 103.2° F. The rise of temperature was thought to be due to local peritonitis at the site of the cannula. So the cannula was removed and the opening was sealed with Tincture Benzoin Co. In the afternoon, again the rumen bloated.

12th day:—The animal was very much emaciated, dull and depressed. Administration of ruminal contents was repeated. In the afternoon tympany increased. Anthisan 20 c.c. was injected intramuscularly.

13th day:—Condition of the animal worsened. Tympany increased. Anthisan was repeated but the animal died in the night.

Postmortem examination:—On autopsy when the ruminal contents were thoroughly searched, a lady's hair pin and a stove pin were detected;

but presumably such small insignificant ferrous metals could not have caused the chronic recurrent tympany. What was more important was the detection of two Hydatid Cysts, size of No. 1 foot ball, involving the left lung, which, by pressure on the Oesophagus, were, in my opinion, the cause of the chronic recurrent tympany.

Observations:—It will be seen that though Cintel Metal Detector can detect minute ferrous metal bodies, yet they may not be always the cause of the symptoms manifested. In this case, the actual cause of the trouble was pressure obstruction due to cysts.

My grateful thanks are due to Drs. M. M. Rao and D. Kohoro for their kind help during the operation and after treatment of the case.

ARTIFICIAL INDUCTION OF LACTATION IN A VIRGIN HEIFER BY STILBOESTROL (M. & B.)

BY

KEWAL RAM GHULATI, L.V.P. (PUNJAB),

Incharge Veterinary Hospital, Jullundur.

Stilboestrol is being extensively used in Western countries for the treatment of anoestrus in cows, to induce lactation in sheep and goats and for several other allied conditions, e.g., false pregnancy, misalliance, pyometra and retained placenta. In this country also it is being used these days in veterinary practice. Luktuke and Bhattacharya (1) were successful in their attempts to induce lactation in dry barren cows and virgin heifers with a dose of stilboestrol, as small as 1/4 to 1 gramme.

The author got an opportunity to treat a mature virgin heifer. A cross-bred Jersey heifer, aged six years, was brought to the Veterinary Hospital, Subathu, (Simla Hills), on 17-5-1949 with the complaint that the animal was never observed in heat. The owner had purchased the animal from the Military Dairy Farm, Subathu. He paid a handsome price for her in the hope that she would turn out to be a good milk-yielding cow, but was very much disappointed to find that she had never showed any sign of oestrus upto this age. The animal was thoroughly examined and, as there was nothing abnormal with the ovaries, the owner was advised to get her treated with Stilboestrol injections, to which he readily agreed.

On 25-5-1949, a dose of 15 milligrammes of Stilboestrol Dipropionate Solution (M. & B.) was injected intramuscularly.

On 27-5-49, the owner was surprised to see the cow with well-developed mammary glands; the teats became prominent, lips of the

vulva were loose and it appeared to him as if she was going to give birth to a calf. On examination at the hospital, no symptoms of oestrus or other systemic disturbances were detected. The owner was asked to bring her again on the next day.

On 28-5-49, the above symptoms were more prominent but, as there were no signs of her coming into heat, another dose of 15 milligrammes of the Stilboestrol Solution was injected intramuscularly.

The above symptoms persisted on 29-5-49 also and the owner was advised to squeeze out the milk as the udder had developed secretory functions and was tense. About half a pound of milk was removed in the morning. In the evening as the udder was again full of milk, she was milked and the quantity of milk was a little more. Milking was started regularly by the owner and the milk yield increased progressively with the result that in two weeks it came to 10 pounds daily. Although the cow did not come in heat, the owner was much pleased to get a large quantity of milk from the animal, which, as he previously thought, was absolutely useless.

From the month of June, 1949, to December, 1949, the cow kept on yielding the same quantity of milk. In January, 1950, the yield gradually came down to 8 pounds a day and in February to 7 pounds a day.

On the 18th of February 1950, the cow showed signs of heat and was covered by a bull.

After covering, the milk-yield got gradually reduced to 3 pounds upto 20th October, 1950, when she was allowed to dry off as she was in ninth month of pregnancy.

She gave birth to a calf on 6-12-50 and now she is giving 9 seers of milk per day.

This case is of special interest as it would be found that a very small dose of Stilboestrol, 30 milligrammes, was sufficient to initiate lactation and maintain it for a considerable period of 17 months.

REFERENCE

1. Luktuke, S. N. and Bhattacharya, P. (1948) *Proc. Ind. Sci. Conf.* 35th Session, III.

INTRAVAL SODIUM AS A GENERAL ANAESTHETIC

By

B. M. PRASAD, G.B.V.C., P.G. (Fowl. Husb.), P.R.S.

Bihar Veterinary College, Patna.

The choice for a good agent for use as a general anaesthetic or narcotic in small animal surgery is very limited. With a view to demonstrate the efficacy of Intra-val Sodium (Soluble Thiopentone), a May & Baker product, as a suitable general anaesthetic, a demonstration was arranged by the author on the occasion of the Ninth Bihar Provincial veterinary Conference held at Patna, so that members of the Veterinary profession, who had come to Patna to attend the session, got an opportunity to see the technique of its administration and its usefulness as a safe general anaesthetic.

Case No. 1.—The subject of the experiment was a mongrel bitch weighing about 20-lbs. She was not given any food the previous evening and, at about 8 a.m. on 31-12-'46, was placed on a table and properly secured. The site of the injection, the region of the external saphena vein, was properly disinfected with absolute alcohol. When the vein became a little prominent, a puncture was made and 5 c.c. of the solution was injected intravenously. The first 3 c.c. of the solution was pushed inside slowly, the process taking about half a minute. The action of the drug was carefully observed and another 2 c.c. was administered in about one minute's time to ensure anaesthesia. After making a brief defensive movement, evidenced by the shaking of the head and legs, the bitch became limp and was more or less in a complete anaesthetic state which lasted for about 32 minutes. During the period of anaesthesia, no reflex movement was observed on application of external stimuli, such as pin-pricks over the body. The heart beat and respiration, which became accelerated at first, slowed down, but they never showed any sign of failing.

After a lapse of about 32 minutes, slight movement of the lips was noticed and the eye reflexes also returned. The bitch was then slowly lifted from the table and laid down on the ground on a soft grass bed. She recovered from the residual effect of anaesthesia after about three hours, and then slowly ran away from the place. While running, she responded to calls but her gait was not steady. By the evening of the same day she was her complete old self. A total of 0.25 gm. of Intra-val Sodium was injected in 5 c.c. double distilled water supplied by the manufacturers.

Case No. 2.—Almost identical actions were observed some time ago in another case, a male mongrel dog weighing about 15-lbs. It was given only 0.20 gm. of the drug in 4 c.c. of distilled water intravenously.

Case No. 3.—A she-goat suffering from gid (*coenurus-cerebralis*) was anaesthetised by the intravenous injection of 0.5 gm. of Intraval Sodium dissolved in 10 c.c. of distilled water. She weighed approximately 35 lbs. Trephining of the skull and removal of the cyst took about 25 minutes and no reflex movement was seen at any stage during the period of anaesthesia. She recovered from the anaesthetic effect in about an hour's time.

In none of these animals was any visible ill-effect noticed.

The drug appears to be a very safe agent and I strongly recommend its further trial by veterinary practitioners.

A CASE OF TETANUS IN A BUFFALO

By

N. R. ADKAR,

*Assistant Veterinary Officer,
Government Milk Colony, Aarey, Goregaon.*

Introduction.—Tetanus is very rarely recorded in dairy cattle and especially in buffaloes. This article is written with a view to record a case of Tetanus in a buffalo in India.

History.—On 15-1-1951 the right horn of a Mehsana buffalo was broken while fighting with another animal and since then the buffalo was under treatment.

On the morning of 23-1-51 the owner reported that the animal was off feed and was disinclined to move.

Symptoms.—The head was slightly raised. The muscles of the neck were stiff and the animal was unable to bend the neck. The jaw was locked. The tail was held stiff and slightly raised at the root. Temperature was 102.6°F. There was marked protrusion of the membrana nictitans over the eyes especially when the head was tapped. Reflex irritation was greatly increased, a touch or a slight noise brought on a spasm.

The case was reported to Dr. Khurana, Veterinary and Artificial Insemination Officer who confirmed the nature of the disease.

Treatment.—The wound at the root of the horn was cauterized with strong carbolic acid and the animal was immediately removed to one of the rooms in Calving Lines—a quiet place with least disturbance.

(1) 1000 c.c. of 8% Sodabicarb solution was given intravenously on the 2nd and 3rd day.

(2) Tetanus Anti-toxin 60,000 I.U. intravenously and 40,000 I.U. intramuscularly on the 4th day.

5th day — Tetanus Anti-toxin 60,000 I.U. intravenously

6th day — do. 40,000 I.U. do.

7th day — do. do. do.

In all 240,000 I.U. of concentrated Tetanus Anti-toxin was administered.

(3) Saturated solution of mag. sulph. 20 c.c. in 2% carbolic acid was injected subcutaneously on either side of the neck, twice a day for the first 10 days, and once a day, for another 10 days.

(4) A saline electuary containing Ext Belladonna Siccum Grs. 15 and Sodium Bromide 2 drachms was administered thrice a day for 4 days.

The animal started wagging the tail on the 7th day but the rigidity of the muscles of the neck and limbs remained the same. On the 10th day the animal was able to bend the neck and showed slight movement of the jaw, but was unable to feed. The animal could sip milk and was given 4 lbs. in the morning and 4 lbs. in the evening. On the 13th day the animal was able to masticate and was given 4 lbs. of green grass. From the next day the animal was fed with 4 lbs. of bran, 2 lbs. of *gur* and as much green grass as it could eat.

The act of rumination started on the 15th day, the movement of the neck was free, but hyperaesthesia and protruding of the membrana nictitans was present though to a much lesser extent.

All the symptoms disappeared on the 20th day. The animal is now completely recovered and is in the 4th month of pregnancy. But the animal has not given a drop of milk since recovery.

My thanks are due to Dr. J. S. Khurana, M.Sc. D.V.M. (Mich.), Veterinary and Artificial Insemination Officer, under whose guidance I successfully carried out the treatment.

TREATMENT OF PAPILLOMA BY HOMEOPATHY

By

B. N. MUKHARJEE, G.B.V.C.,

*Laboratory Veterinary Assistant Surgeon,
Nagpur, Madhya Pradesh.*

Papilloma or warts which are either soft or hard are very common in young calves, grey horses and dogs. Warts seen in horses, particularly aged grey horses, are quite different from those seen in cattle. In cattle,

it is observed usually in young calves. These are believed to be caused by a filterable virus. Their disappearance synchronises with the immunity that is imparted. Artificial immunisation with formalinised suspension has been practised in some countries. A treatment which has been found satisfactory by me is the subcutaneous injection of 10 drops of Thuja of 200 potency of Homeopathy dissolved in 1 c.c. of rain or distilled water in calves; and 1 drop in the same amount of water in dogs. This is to be repeated once a week if the first injection does not show signs of decay of warts i.e. change of colour, and falling off after rubbing. This treatment I have found successful in many cases.

A CASE OF THORACODIDYMUS OCTIPES IN A SHE-BUFFALO

By

B. VENKATARATNAM

Veterinary Assistant Surgeon in Charge Veterinary Hospital, Gurzala.

A she-buffalo was brought to the Veterinary Dispensary, Gurzala, Guntur District at 5-30 P.M. on 5-11-1950 with the history that she started showing labour pains at about 3 P.M. on the same day. At the time of examination, she was bright in appearance and her general condition was good.

On external examination, two limbs were seen protruding from the vulva. On further examination, the foetus was found to be dead and in posterior presentation. Delivery was effected by traction. It was surprising to note that the foetus delivered was a double monstrosity comprising of two female individuals attached at the sternal region. A feature worthy of note in this particular case was that during the examination before the application of traction, the head of one individual was thought to belong to the other which presented its hind limbs at the vulva. The she-buffalo survived the dystokia.

Anatomically the monstrosity represents "Thoracodidymus octipes."

CELOSOMIAN MONSTROSITY IN A GOAT

By

Y. RAMANUJAM, G.M.V.C., V. GURUMURTY, G.M.V.C.,
and

J. VENKATANARAYANA, B.V.Sc.

*Department of Animal Hygiene, Agricultural College,
Bapatla, Guntur District.*

A local-bred, aged, she-goat was brought to the Veterinary Hospital attached to this College, within a few hours of its showing signs of labour.

All the four limbs were protruding out at the time. Sterno-abdominal presentation was suspected but with slight manipulation and simple traction, the kid was delivered out.



FIG. 1

FIG. 2

FIG. 3

The following are the peculiar features of the specimen :

1. The body is so bent on itself that the head and neck lie side by side with the quarters and tail and all the four limbs are more or less grouped under the head (Figure 2).
2. Partial exposure of the brain due to the under-development of the parietal and absence of the inter parietal and occipital bones.
3. Improper development of the diaphragm exposing the heart.
4. Absence of all the boundaries of the abdominal cavity except the roof showing out the stomach, small intestines, liver and the umbilical cord, (Figure 3.)

Monstrosities being rare in goats, this specimen is recorded.

The authors are thankful to the Principal and Lecturer in Entomology and the Artist of the College for the photographs.

College News

BIHAR VETERINARY COLLEGE

The following students are declared to have passed the Diploma Examination (Supplementary) held in July 1951.

(In order of merit)

- | | | |
|----------------------------|-----|---------------------|
| 1. Santanu Kumar Pande | ... | Bihar Private |
| 2. Narm Deshwar Singh | ... | Bihar Private |
| 3. Sachichidanand Sinha | ... | Bihar Private |
| 4. Sidheshwar Prasad Sinha | ... | Gaya District Board |
| 5. Raj Nandan Prasad Singh | ... | Bihar Private |

(Compartmental)

- | | | |
|----------------------------|-----|-------------------|
| 6. Jagannath Biswal | ... | Orissa Government |
| 7. Rajendra Prasad Sinha | ... | Bihar Private |
| 8. Manibhushan Nath Laskar | ... | Assam Government |
| 9. Nabaghan Bisoi | ... | Orissa Government |

Patna, }
23rd July, 1951.

H. R. KAPUR, M.R.C.V.S.,
Principal.

Association News

THE MADRAS VETERINARY & LIVESTOCK INSPECTORS' ASSOCIATION

The first annual conference of the above Association was held at the Madras Veterinary College on the 16th and 17th June 1951. Rao Bahadur R. Swaminathan, B.A. G.M.V.C., presided and Sri V. R. Rajagopalan, G.M.V.C., Dip. Bact. (Manchester), Director of Animal Husbandry, Madras, inaugurated the Conference which was well attended by the members of the Association and visitors.

The proceedings commenced with a prayer by Sri Y. Viswanathan, a Veterinary and Livestock Inspector.

Sri A. P. Rao, Secretary of the Association, welcomed the gathering and, in doing so, he gave a brief history of the Association with its objects and aims. He said that during their two years' training at the Hosur Cattle Farm and at the Madras Veterinary College, the Veterinary and Livestock Inspectors get 'sufficient grounding in both the disease side and improvement side of Animal Husbandry' and that they were very confident that they would be able to fulfil the objects of the Government in starting this course viz. to

render professional help to villagers and advice ryots in matters relating to the improvement of livestock. He then dealt in detail about the work assigned to them and said 'Our members are very enthusiastic and are very earnest and very eager to do their best in carrying out Livestock work even to the remotest villages and they will not consider any work unsuited to them as long as they do not deviate from their training. The members of this Association are very anxious to undertake Livestock Improvement work in rural villages and also in Firka Development Schemes. In the proposed Key Village Scheme where the work is intended to be concentrated for intensive breeding, our services might prove to be very valuable. Our services could also be best utilised in Livestock Farms and poultry breeding stations and sheep rearing units where improvement of Livestock is primarily aimed at.'

He then mentioned that their services could be utilised for Artificial Insemination work after a few months' training in that line of work. He stressed that in the selection of students for this course there should not be lowering of the prescribed qualification so that 'the high standard and the dignity of their qualification may be maintained. Lastly, he pleaded for a revision of their pay and prospects suited to their basic qualification and period of training.

Sri V. R. Rajagopalan, in declaring the conference open, said, that the Veterinary and Livestock Inspectors have got a very responsible job, in that they will have to be in constant touch with the villagers and cater to their livestock and Veterinary needs of the day. He said that the Inspectors by virtue of their two years' intensive training would prove capable of discharging their duties which are indeed onerous, but hard and responsible. He was glad to note the zeal and enthusiasm of the members, which he wanted to transform them into practical use. He then advised them on their correct approach to people and said, 'You will have to be courteous to the public whom you are serving, and a little sympathetic understanding and tractful persuasion on your part, is all that is required to win over the public. You will form the link between the ryots and the department and it is your duty to bring home to the ryots the results of the activities of the department and put them into practice and form the soliders of a land army of the Extension service envisaged by Hon'ble Shri Munshi, Minister of Agriculture and Food to Government of India.

'Let me say a few words of personal advice. You have been given sufficient training to carry out certain livestock and veterinary duties. Do not hesitate to consult your immediate superior officers. You may consult the Veterinary Assistant Surgeons, District Veterinary Officers and specialists as you may often need advice. Confide your problems and difficulties and elicit their opinion and advice. Seek this guidance at every difficult step. As members of a noble profession, and as custodians of the welfare of the livestock,

let us all march as one organised unit and reach the goal, a healthy and prosperous Animal Husbandry State, contributing to Grow More Food and wealth in the country.'

Sri R. Swaminathan then delivered his presidential address. In the course of that address he spoke as follows :—

At a time when the demand for more and more Veterinary aid, especially in the interior tracts of the State, became very insistent, it was found that the Madras Veterinary College was not able to turn out the required numbers in sufficient strength every year. It was also found that certain routine duties of the Veterinary Assistant Surgeons could easily be performed by persons who need not necessarily have the high standard of a Graduate of Veterinary Science. A shorter period of education after the S.S.L.C. was thought good enough for carrying out these routine duties and with that background the course of studies has come into existence. The first two of these batches of Inspectors have emerged out of this course during the last 2 years and, although it may appear premature to offer any opinion, the general view about these Veterinary and Livestock Inspectors is very favourable (*Loud Cheers.*) They have created a good impression already and it is to be hoped they will maintain this initial good start and fulfil the objects with which they have been brought into existence.

He went on further and advised the Veterinary and Livestock Inspectors to have zest in their work and concentrate their thoughts more on their duties and responsibilities and less on their rights and privileges. Then it must follow, he said, as a natural sequence, that you cannot go far wrong and that you will create conditions for a very favourable consideration of your service conditions.

In the afternoon the annual general body meeting of the Association was held and a number of resolutions were passed with a view to improve the pay and prospects of the members of the Association and also to improve their facilities for efficient discharge of their duties.

On the second day of the Conference the Association arranged for an excursion to the Poultry Research Station and the Milk Factory at Teynampet. With this the conference ended.

THE VETERINARY STOCKMAN-COMPOUNDERS AND VETERINARY COMPOUNDERS ASSOCIATION, MADRAS

The first General Body Meeting of the above association was held on 5-8-51 at the Madras Veterinary College hall under the presidentship of Sri C. V. Padmanabhan, retired District Veterinary Officer.

The Conference was declared open by Sri P. Srinivasa Rao, Editor, *The Indian Veterinary Journal*. In his inauguration speech Sri Srinivasa Rao stressed the necessity of being disciplined and united and advised the compounders about their various professional matters.

Sri V. R. Balakrishnan of Cannanore welcomed the gathering and spoke at great length on their meagre salary as compared with their brethren in the medical department. He compared the duties of the Medical and Veterinary compounders and showed clearly how the work of the latter was more arduous and risky.

Dr. C. V. Padmanabhan, in his presidential address, dealt with the various problems facing Veterinary compounders and also detailed the risks and hardships of these compounders in the past and in the present. He spoke appreciatively of the work of these compounders and pleaded for an improved status for them in the profession.

A few other members also addressed the gathering. With a vote of thanks from Sri P. Balakrishnan Nair of Tellicherry, the meeting ended.

Abstract

Myopathies in Animals—*J. Innes J. R. M. (1951) Br. Vety. Vol. 107 No. 4, pp. 131-143.*

Cases of pseudo-hypertrophic muscular dystrophy in dog, neuropathic muscular atrophy in sheep, congenital muscular dystrophy (weisses Fleisch) in a lamb and histiocytic myositis in dog, with histo-pathological details are described for the interest of clinicians and comparative pathologists. The literature of occurrence of above conditions in human pathology is cited. These conditions may never have been recorded, but for keen observation of clinical cases and a thorough and meticulous post-mortem.

(This abstract may help to focus attention on the pathology of muscular disorders and the need of performing post-mortem with care and precision, in this country) H. K. L.

Nature and Diagnosis of Pasteurella invasion in blood circulation.—

By R. N. Naik, G.B.V.C., *Ind. Jl. Vet. Sci. & Ani. Husb.* Vol. XIX, Part IV. (Author's summary)

It is observed from the results that septicaemia actually occurred much earlier than what was believed to be so far in pasteurellosis. This septicaemia can be detected only by carrying out animal inoculation test in rabbits which are most susceptible to the disease. Other methods of detection viz. cultural test and microscopic examination are not so efficient as the biological test.

Diagnosis of *Pasteurella* outbreaks in the field can be accurately made, when fresh dead cases are not available, by collecting a few c.c. of blood from an affected animal which is, in as advanced a stage of the disease as possible, i.e. about 20 and 14 hours before death in buffaloes and cattle respectively, and subjecting the blood or arranging to subject it to rabbit inoculation test and recovering the pathogenic organisms from the experimental rabbit. A young animal preferably a buffalo should be selected for the collection of blood if more than one cases are available.

The observation of the workers in Western countries is that buffaloes are more susceptible to pasteurellosis than cattle. Indian field workers' experience has been also the same. But Bennet (1926) stated that both the species of animals in India were of approximately equal susceptibility. In the experiments reported in this article it has been revealed that the first invasion of *Pasteurella* occurred in blood circulation 2.15 hours, 13 hours and 36 hours after infection in the rabbit, buffalo and bull, respectively which indicates conclusively that the degree of susceptibility of each of the species mentioned to pasteurellosis is in the descending order and that the buffalo is more susceptible than the ox. The susceptibility of animals to a disease particularly of bacterial origin can be judged better by the data of the first invasion of the causal agent in the blood circulation and of the percentage death due to the same than by the latter alone.

Extract

GOVERNMENT OF INDIA PLANNING COMMISSION

The first five year Plan

A draft outline

[The following section on 'Animal Husbandry' from the planning Commission Report is extracted for the information of our readers. Ed. I.V.J.]

India has to support today about 177.4 million heads of cattle which is nearly one-fourth of the world's total bovine population. Except in a few favourable localities where there are special facilities of good pasture land enabling cattle breeding to be developed as an independent industry, the rearing of cattle is an industry subservient to agriculture. Maintenance costs are considerably reduced as cattle are generally fed on fodder which is a by-product in the raising of food crop. Throughout the country agriculture and animal husbandry are thus complementary to each other.

2. The problems of cattle development in India can be considered under the following four heads.

- (i) Feeding,
- (ii) Breeding,

- (iii) Removal of useless cattle; and
- (iv) Protection against diseases.

3. *Feeding.*—Lack of adequate feeding is the most important cause of the poor condition of cattle. It is a common experience to see how cattle in India immediately respond to better feeding and care. The cultivator bestows priority in feeding and maintenance upon his plough and milch animals. The rest of the cattle are maintained from a variety of considerations, e.g., little cost, future progeny, manure, but much care is not taken of them.

4. It is estimated that the total supply of roughage can maintain only 78 per cent. of the cattle population and the supply of concentrates is very much smaller. The problem of better feeding can be tackled mainly by providing better feed to a smaller number of animals. Better feed can be produced by popularisation of mixed farming which, in some cases, will involve some diversion of the area under foodgrains to fodder crops. The reduction in the area will, however, be more than counter-balanced by greater yield due to better fed bullocks working more efficiently and increased supplies of milk and milk products. Another method in the same direction is to seed existing pastures with better yielding and more nutrient species of grasses. In all intensive cultivation-zones stress should be laid on these aspects of agricultural practice.

5. *Breeding.*—Cattle breeds are generally classified as milch, draught and dual purpose breeds. From the point of view of the cultivator the dual purpose animal is the most useful. India has well defined local breeds, and State Governments have cattle breeding farms for some of these breeds. Under the present breeding policy different areas have been designated for the purpose of development of particular breeds. Where the local breed lacks specifically either in milch or draught qualities, the deficiency is made up by crossing it with another suitable breed. Most of the cattle population of the country is, however, of a non-descript type and the objective is to upgrade them with pedigree bulls of the particular breed indicated for that locality.

6. The most common method for upgrading is to provide a sufficiently large number of pedigree bulls which would cover all the cows in the locality while all the local scrub bulls are castrated. One of the difficulties in adopting this method on any large scale is that at present about 750 good pedigree bulls are produced every year in various cattle breeding farms as against our estimated requirements of about one million. This deficiency can be met in the following two ways:—

- (1) By the introduction of the key village scheme. Under this scheme, while pedigree bulls are issued to a group of villages, the selected progeny of these bulls is specially reared on State

breeding farms and issued again as stud bulls. This is the quickest method of multiplying our supply of pedigree bulls. Over Rs. 3 crores have been provided for expenditure on the key village scheme in the Central Government's plan.

- (2) Establishment of artificial insemination centres with a view to increasing the coverage of pedigree bulls. While an ordinary bull can cover about 60 to 80 cows by natural mating, by artificial insemination about 500 cows can be served. Investigations and trials conducted under Indian conditions have proved that artificial insemination centres are quite successful and the initial prejudice of the cultivator is soon overcome. There is undoubtedly a promising future for such centres in India. Schemes for increasing their number have been included in the State plans.

7. *Removal of useless cattle.*—This is by far the most important and most difficult problem of cattle development. It is estimated that at least ten per cent. of the total population consists of unserviceable and unproductive cattle (*vide* Report of the Cattle Preservation and Development Committee, Government of India). It is somewhat difficult to gauge the effect of Article 48 in Part IV of the Constitution of this problem. In so far as it is interpreted as preventing slaughter of decrepit and useless cows it may be said to have aggravated it. Another result of such a provision is the adverse effect it might have on the manufacture of glandular products like insulin, adrenalin and liver extract. On the other hand, by preventing the slaughter of calves and milch and draught cattle which formed a considerable portion of the animals slaughtered for beef and particular varieties of hides, the Constitution has taken a positive step in furthering the development of cattle in India. The figures of cattle population for the past two decades in undivided India indicate that unrestricted liberty to slaughter which prevailed in the past had no appreciable effect on the total cattle population of the country. This indicates that the size of the problem is not materially affected by the provision in the Constitution prohibiting the slaughter of cows. As the normal slaughter of cattle does not make any significant impression on the problem and the wholesale slaughter of useless animals is not a practical proposition, some other remedy has to be thought out to meet the situation. One such remedy is the opening of large camps in areas where the fodder supply today is unutilised. The old and useless cattle are transferred to these camps through the *Pinjrapoles* and thus pressure on existing fodder supply is reduced. Suitable arrangements can be made at these camps for the utilisation of the manure of these cattle and, their hides, etc., after their natural death.

This method has not yet been tried on any scale but, as we can see no alternative solution, we recommend its trial. It should not, however, be adopted on any large scale unless experimental projects have established its claim. A sum of Rs. 1 crore has been provided in the Plan for this purpose.

8. The problem of dry cows in cities is also important from the view of preservation of good cattle. It is observed that good good milch cows are brought to the bigger cities like Bombay, Calcutta and Madras and when they get dry they are sent to slaughter houses. Establishment of dry cattle salvage farms and the gradual removal of the existing cattle population of these Cities to the surrounding rural areas are important measure for preservation of cattle. The programmes of some States provide for a start in this direction during the period of the Plan.

9. *Protection against diseases.*—India has made considerable progress in this direction in the past few years. Rinderpest claims the largest mortality of cattle. An inexpensive serum (lapinized vaccine) has now been evolved against it and preventive inoculation on a large scale with this serum can effectively eradicate the disease, and work in this direction has to be expanded.

Another disease which causes very considerable loss of working hours and of milk yield is the foot-and-mouth disease. No preventive measure against the onset of this disease has yet been developed.

10. The lines of future cattle development lie in concentrating on activities described above, to begin with, in selected areas where they can be introduced along with other items of agricultural and rural development. Preventive action against cattle diseases has of course to be organised on the widest possible scale.

Projects included in the first part of the National Plan, 1951-56.

Central Government's Scheme. (Rupees in lakhs).

Scheme	2 Years' Total	5 Years' Total
	1951-53	1951-56
1. Key Village Scheme.	8.25	321.90
2. Agricultural and Animal Husbandry Research.	30.00	100.00
3. Livestock and Fishery Statistics.	2.00	8.00
4. 'Gosadans' or concentration camps for cattle.	25.00	100.00

Review

Artificial Insemination and Animal Production.—By Dr. J. D. Sampath Kumaran, M.A., L.V.P., Ph.D. Madhya Pradesh Veterinary College, Jabalpur. Price Rs. 15/- [Copies can be had through the Editor, I.V.J.]

This book comes at a time when India is becoming increasingly conscious of the importance of artificial insemination as an instrument for the mass improvement of cattle by overcoming the existing acute shortage of pure-bred bulls of the different breeds. Books on artificial insemination are few in number and this book comes as a valuable addition to the existing few. The need for a book incorporating the latest information on all aspects of artificial insemination has been felt for a considerable time and the publication of this book removes this long-felt want.

The material is well arranged in different chapters covering the various aspects of sperm physiology, artificial insemination and endocrinology of reproduction. The chapter on the advantages and limitations of artificial insemination could have been enlarged to emphasize the role of artificial insemination in the rapid improvement of the livestock of under-developed countries like India. The chapters on semen characteristics and methods of evaluation and semen preservation are indeed classic and written in a very able manner bringing together the latest information in these fields. Semen evaluation and preservation constitute the most important steps in artificial insemination work and the author has done great justice to these aspects. Under the discussion on sperm morphology some techniques for the staining of sperm could have been included. The chapter on the male reproduction system goes too much into the details of the endocrinology of reproduction, which may not be of interest to the student but is of great value to the research worker. A separate chapter could have been devoted to a discussion on fertility and sterility which are practical problems of the day and so closely related to artificial insemination. The chapter on breeding methods deserves to be suitably enlarged to give more details of the advantages and disadvantages of the various systems of breeding.

On the whole this book is a valuable addition to the few on artificial insemination and will surely receive a very good welcome. The chapters are well arranged and the subject dealt with in a masterly manner. This book is designed to meet the requirements of the student of artificial insemination, the field worker and the research worker alike.

C. K.

The Infectious Diseases of Domestic Animals.—Second Edition. By W. A. Hagan, D.V.M., D.Sc., and D. W. Bruner, D.V.M., Ph.D., Publishers: Comstock Publishing Company, Inc. Associated with Cornell University Press Ithaca, New York, 1951. Publishers of the book throughout the British Empire are:— Bailliere Tindall & Cox, London W. C. 2. Price 63s. net. [Copies can be had from them and also through the Editor, I.V.J.]

The second edition of the Infectious Diseases of Domestic Animals by W. A. Hagan and D. W. Bruner is a welcome addition to the text books on the subject.

As the authors claim, the work is not a systematic discussion of disease producing organisms but rather a discussion of infectious diseases of animals with special reference to their etiological factors, diagnosis and biologic therapy. Naturally the scope of the work is very large, particularly as diseases caused by Fungi and Protozoa are also included. Consequently the discussions are not exhaustive. The work is a statement of well established facts in condensed form without any pretence to discussion of literature: the discussion on the Serology of the Salmonellas in an example. Some of the rarer conditions have escaped notice e.g. the occurrence of *C. equi* in animals other than horse and swine.

This second edition contains a new chapter on Chemotherapy and notes on chemotherapy and anti-biotic therapy under the individual pathogenic agents. Some of the sections have been expanded to include newer knowledge on the respective subjects. Over 25 new virus diseases have been discussed. Among them are Virus dermatitis in goats, Lumpy skin disease, Infectious canine hepatitis, Hard Pad disease of dogs, Epizootic fox encephalitis, "East African" Swine fever, Virus diarrhoea of cattle, Long Island duck disease etc. Under Fungus diseases, new sections or sub sections on *Blastomyces dermatitis*, *Cryptococcus neoformans*, *Rhinosporidium seeberi*, and *Histoplasma capsula-torm* are included. Several species of *Eimeria* affecting domestic animals not found place in the first edition are briefly described here.

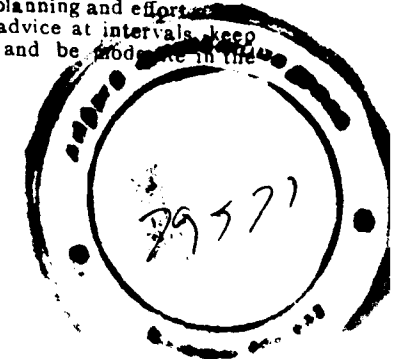
The book is got up neatly on glazed paper and the text which runs to 920 pages is fairly well illustrated. A bibliography is appended at the end of each subsection.

Obiter Dictum

Sri M. Viswesvaraya while being felicitated on his 91st Birthday at a reception held in his honour at Bombay on 15th September 1951 said, 'It is after all, not the mere tale of years either way that matters, but energy, vitality and force of character'.

"To live long and lead an active life requires some planning and effort, not all mere luck. One has to take health precautions, medical advice at intervals, keep body and mind fit and alert for physical and mental work and be moderate in the enjoyment of luxuries and the good things of life."

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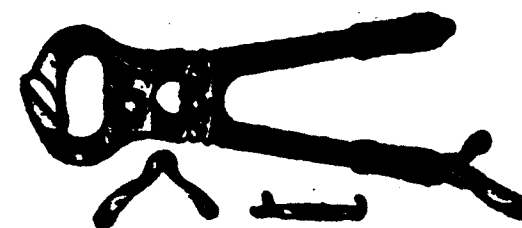
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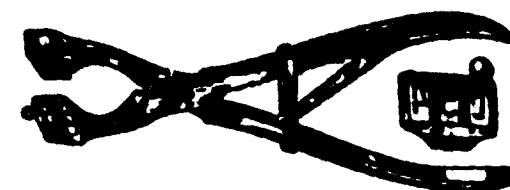
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